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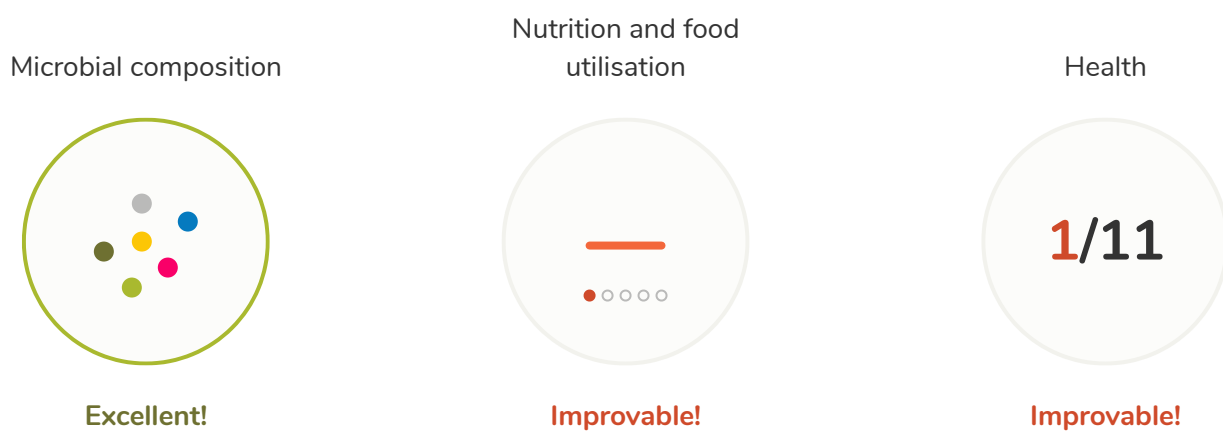
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Your personal microbiome report

The aim of myBioma microbiome analysis is to examine all bacteria in your stool using next-generation gene analysis, determining the 16S gene of the bacteria. It is thus possible to classify these organisms in the intestine and draw conclusions about your health by utilizing the myBioma knowledge database.



Your microbial composition is varied and well balanced. You seem to be eating a balanced diet, but your intestinal bacteria could help you more efficiently in the utilization of the ingested food. There is some need for improvement in your health, especially regarding the following health conditions: Metabolic syndrome, Insulin balance, Intestinal mucosa, Irritable bowel syndrome, Gut-brain axis, Diarrhea, Gut-liver axis, Gut-heart axis, Gut-skin axis, Gallstones, Joint health.

You can find your personal suggestions for improvement on page 36.

Please note: The detection of a microorganism by this test does not mean that it is a disease. Similarly, failure to detect a microorganism by this test does not preclude the presence of a disease-causing microorganism. Other organisms may also be present which are not detected by this test. This test is not a substitute for established methods of identifying microorganisms or their antimicrobial sensitivity profile. The bacteria and results described in the health conditions only give an indication of possible problems. It is not a diagnosis and cannot be considered as such.

Summary

Your personal microbiome report is comprehensive and contains a lot of knowledge about the effect of bacteria on your health. Below is a summary of the most relevant results to give you a quick overview.

Further information about the results can be found on the detail pages - please use the table of contents.

Microbial composition

Index	Value	Average	Interpretation
✓ Species richness	259	231 - 346	Excellent!
✓ Diversity	6.45	5.80 - 6.56	Excellent!
✓ Species evenness	0.80	0.74 - 0.79	Excellent!

Nutrition and food utilisation

Parameter	Result	Average	Interpretation
🌿 Enterotypes	Prevotella	-	Enterotype 2
✓ Caloric intake	1.1	1.0 - 1.8	Excellent!
⚡ Sugar metabolism	83	100	Good!
⚡ Lipid metabolism	75	100	Good!
⚡ Vitamin metabolism	84	100	Good!
⚡ Protein metabolism	84	100	Good!

Health

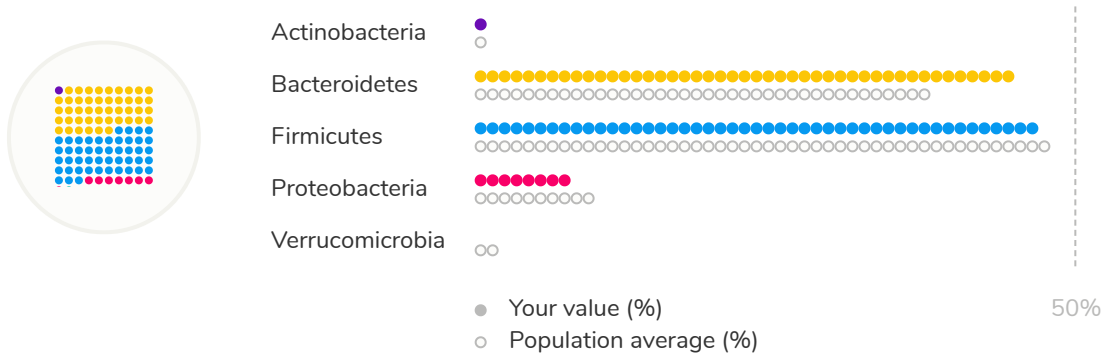
- ⚡ Intestinal mucosa
- ⚡ Metabolic syndrome
- ⚡ Irritable bowel syndrome
- ⚡ Insulin balance
- ⚡ Gut-brain axis
- ✓ Kidney stones
- ⚡ Gut-heart axis
- ⚡ Gallstones
- ⚡ Gut-liver axis
- ⚡ Joint health
- ⚡ Gut-skin axis

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Microbial composition

Overview of all bacteria



Your microbiome is unique. Therefore, the composition of the bacteria in your gut system may differ from that of the average population

Description

The human gut system is dominated by five bacterial strains - *Actinobacteria*, *Bacteroidetes*, *Firmicutes*, *Proteobacteria* and *Verrucomicrobia*.

These complicated names describe the taxonomy (= classification) of the bacterial strains.

The further you read through your personal report, the better your understanding of these will be.

In this chapter, we compare the composition of your intestinal bacteria with the average values of the population. Since your microbiome is unique, it is normal for your values to be different from the average.^{7,8}

Detailed information

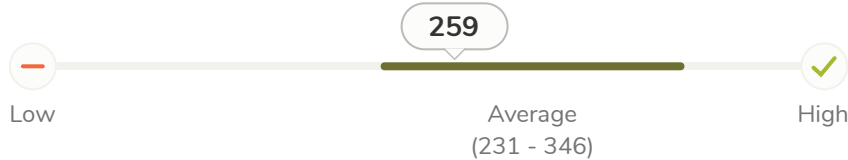
Type	You (%)	Population (%)
● Actinobacteria	0.11%	1.08%
● Bacteroidetes	44.98%	37.72%
● Firmicutes	47.34%	48.29%
● Proteobacteria	7.52%	9.81%
● Verrucomicrobia	0.00%	1.64%

Species richness



Excellent!

Number of different bacteria



The number of different bacterial species in your intestine is **259**. Thus, the microbial diversity in your gut system is within normal levels. If your species richness was a bit higher, your microbiome could help you fight off diseases even better. You can find out how to support your microbiome in your personalized recommendations.

Description

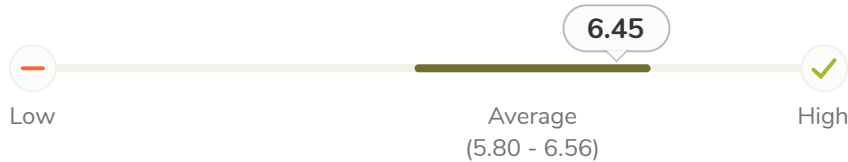
Species richness describes the number of different species / types of bacteria in your gut system. In a more diverse microbiome, the large number of different bacterial species can contribute to many different functions being carried out by bacteria. As a consequence, your body can utilize food and nutrients better, as well as handle stress and malnutrition more easily.^{9,10}

Diversity



Excellent!

Shannon index (= diversity of your microbiome)



The diversity of your microbiome is outstanding. This means that your microbiome ideally supports you during your daily challenges.

Description

Diversity describes the variety of the microbiome. Species richness describes how many different types of bacteria are in your gut. Diversity also indicates whether the different types of bacteria occur evenly in the intestine or whether some types of bacteria dominate. The Shannon index is the most commonly used numerical indicator to represent this biological diversity. The more different bacterial types are evenly distributed in your gut, the greater the diversity in your gut and the more resilient your microbiome is. Furthermore, many studies have shown that a low degree of diversity is associated with disease.^{6,10,11,12,13}

Risk factors

The personal microbiome is individually shaped by various environmental influences, such as antibiotic intake, infections, stays abroad, an unbalanced diet or smoking. Another factor influencing biodiversity and diversity is increasing age.

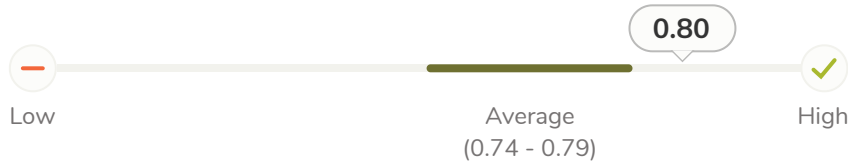
i A varied diet with **lots of fiber** promotes bacterial diversity. Whole grain products, natural rice, fruit and vegetables contain a lot of fiber. Find out more in your personal suggestions for improvement.

Species evenness



Excellent!

Pielou index (= balance of your microbiome)



Your microbiome is well balanced. This means that your bacteria are distributed evenly.

Description

Species evenness is a further measure to characterize the biodiversity of the intestinal bacteria. It expresses how often one type of bacteria occurs in your intestine compared to other bacteria. The higher the equitability, the more balanced the spread of different bacteria between species. For example, if there were only two species in your microbiome, Lactobacillus and Enterococcus, then 2% of Lactobacilli and 98% of Enterococci would have a low equivalence. However, if 50% Lactobacilli and 50% Enterococci are present, the species equivalence would be very high.

Risk factors

Just like diversity, species evenness is influenced by various environmental factors, in particular infections, antibiotic intake and an unbalanced diet.

Probiotic bacteria



Good, easy to improve!

● ● ● ● ✓ very good
● ● ● ● ● – improvable

You have many probiotic bacteria. However, a few bacteria are under-represented. Find out how you can improve the ratio of these bacteria in your personalized recommendations.

Description

The World Health Organization (WHO) defines probiotics as living microorganisms that are beneficial to your health when administered in sufficient quantities. The probiotic bacteria listed here are typically found in readily available foods or probiotic supplements. It is important to keep in mind that your microbiome is unique and that the amount of each bacterial species does not necessarily have a negative impact on your health. As diverse as nature is, there are certainly healthy people in whose gut few probiotic bacteria can be detected.

Detailed information

Bacterium	Your result	Food containing the probiotic bacterium
- Bifidobacterium 14 15 16 17 18 19 20	Low	Natural yoghurt, kefir
✓ Enterococcus 25 26	Normal	Mozzarella, camembert, goat cheese, green olives, millet products
- Lactobacillus 21 22 23 24	Low	Natural yoghurt, cheese, kefir, kombucha, sauerkraut, sourdough bread, pickles, olives
✓ Lactococcus 26	Normal	Buttermilk, kefir, cheese
- Streptococcus 24 26	Low	Natural yoghurt, kefir, cheese

i The scientific situation regarding probiotic bacteria has not been fully clarified, therefore a general recommendation for taking probiotic supplements is currently not possible. However, they can be supplied by diet or dietary supplements.

Nutrition and food utilisation

Enterotypes



Enterotype 2

This enterotype is particularly common among vegetarians. Only every 10th vegetarian has an enterotype 1. *Prevotella* bacteria mainly degrade sugar protein complexes that are found in the mucous membranes of the intestinal mucosa. In addition, these bacteria mainly produce vitamin B1 (thiamine) and folic acid. Enterotype 2 is often a strong indicator for a healthy gut system. Your enterotype can also break down and store sugar quickly.

Description

Although your microbiome is as individual as your fingerprint, it can still be roughly subdivided into a basic microbiome, the so-called enterotype. The enterotype develops during the first years of life. It is independent of gender, age or geographical origin. Your enterotype is mainly related to your genetics and eating habits. Each enterotype is dominated by a different bacterial strain. The enterotype affects energy production from food as well as the production of vitamins. ^{49,50,51,52}

A distinction is made between three enterotypes:



Enterotype 1

= Especially for people who often eat meat: *Bacteroides* ^{49,50,51}



Enterotype 2

= Especially for people who eat vegan or vegetarian food: *Prevotella* ^{49,50,53,96}



Enterotype 3

= Especially for people who prefer a balanced diet: *Ruminococcus* ^{49,51}

Detailed information

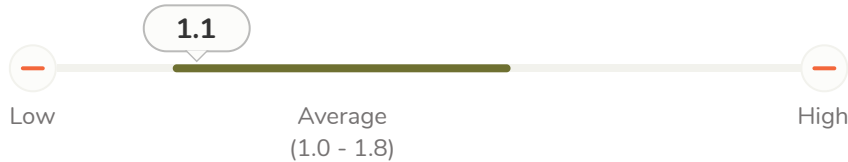
Bacteria type	Ratio
Bacteroides	0.4 x
Prevotella	4.0 x
Ruminococcus	0.2 x

Caloric intake



Excellent!

Ratio of Firmicutes to Bacteroidetes



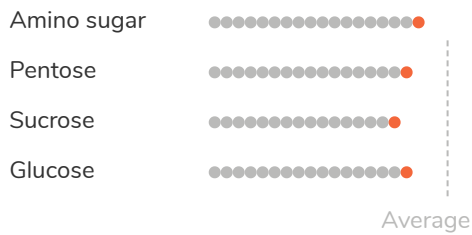
The ratio between *Bacteroidetes* and *Firmicutes* in your gut is very good. Your bacteria can utilize enough calories from the ingested food. Because these bacteria are in a balanced ratio, the probability of being overweight is lower.

Description

Firmicutes and *Bacteroidetes* are the most common representatives of colon bacteria. *Firmicutes* can split non-digestible fiber and store it for "bad times". Thereby giving the body more energy when needed. The number of *Bacteroidetes* increases as soon as the bodyweight is reduced. Therefore, one can draw conclusions about how good the calorie utilization in your body is. When you lose weight through a calorie-restricted diet, this ratio usually decreases as well. ^{50,54,67,137}

i You can change the number of *Bacteroidetes* by altering your diet. *Bacteroidetes* prefer e.g. high-fiber diets such as flaxseed, legumes and whole grains.

Sugar metabolism



Your microbiome delivers support in the processing of sugar.

Description

The body obtains about half of the energy it needs from carbohydrates. Dietary carbohydrates can be divided into three main categories:

1. Sugars, such as granulated sugar and fruit juices
2. Starch, such as found in rice and cereals
3. Fibers, such as found in vegetables and nuts. In fact, we humans cannot digest dietary fiber, though they promote your microbial growth.

The first two categories - sugar and starch - are broken down and absorbed in the intestine. Amino sugars, pentose, sucrose and glucose belong to the first two categories. Your body obtains its energy by burning these sugar molecules. This energy can also be converted into fat and stored for later use.^{27,28,29}

Microbiome

Intestinal bacteria can partly utilize these carbohydrates and also influence how much sugar you absorb. This predictive functional analysis of intestinal bacteria tells you how your intestinal bacteria perform the task of recycling sugar. These values are compared to the average population (average = 100%).

Detailed information

Sugar	Your value (%)
Amino sugar	88 ↓
Pentose	83 ↓
Sucrose	78 ↓
Glucose	83 ↓

Lipid metabolism



Your microbiome delivers support in the processing of fatty acids.

Description

Lipid metabolism includes all processes involved in the breaking down of dietary fats and the building up of fatty acids in the intestine. Important components such as triglycerides, cholesterol and other fatty acids from your diet are absorbed by your digestive system.^{27,28,29}

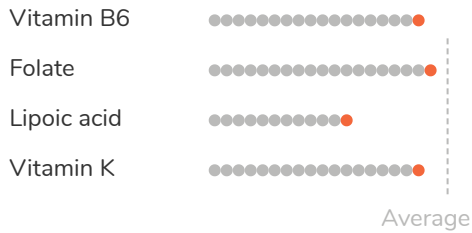
Microbiome

Steroids, fatty acids and sphingolipids are important representatives of fats and are processed and reused by the intestinal bacteria. These serve as energy sources and are important for your brain and nervous system as well as being cell building blocks and the basis for the production of hormones. This predictive functional analysis of intestinal bacteria tells you how your intestinal bacteria perform the task of recycling fats. These values are compared to the average population (average = 100%).

Detailed information

Fat	Your value (%)
Steroid	67 ↓
Fatty acid	85 ↓
Sphingolipid	72 ↓

Vitamin metabolism



Your microbiome delivers support in the production of vitamins.

Description

Vitamins are vital substances and necessary for energy production, immune function, blood clotting and other functions. Minerals, that along with vitamins belong to the group of micronutrients, play an important role in growth, bone health, fluid balance and various other processes. The body cannot produce most micronutrients itself. Therefore, these micronutrients must be ingested regularly with food.^{27,28,29}

Microbiome

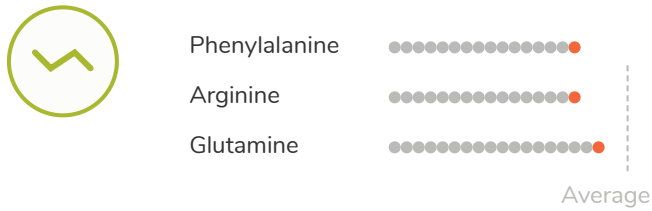
Some bacteria can produce vitamins themselves. Among other things, they produce vitamin B6, vitamin K, lipoic acid and folic acid in small amounts.

This predictive functional analysis of intestinal bacteria reveals how your intestinal bacteria divide tasks regarding the utilization and production of vitamins. These values are compared to the average population (average = 100%).

Detailed information

Vitamin	Your value (%)
Vitamin B6	90 ↓
Folate	93 ↓
Lipoic acid	62 ↓
Vitamin K	92 ↓

Protein metabolism



Your microbiome delivers support in the processing of proteins.

Description

Proteins do most of the work in the cell and have many other tasks. Examples include growth and maintenance of tissue, production of enzymes and hormones, regulation of the concentration of acids and bases in your blood and other body fluids, and formation of antibodies in your immune system to fight infections. Likewise, proteins have a storage function (e.g. ferritin, which stores iron) and they can supply your body with energy. Important protein building blocks (= amino acids) are phenylalanine, arginine and glutamine. ^{27,28,29}

Microbiome

Your intestinal bacteria contribute to the proper metabolism of proteins and thus help keep the processes described above running smoothly.

This predictive functional analysis of intestinal bacteria reveals how your intestinal bacteria divide the tasks of utilizing and further processing of proteins and their building blocks. These values are compared to the average population (average = 100%).

Detailed information

Protein	Your value (%)
Phenylalanine	81 ↓
Arginine	79 ↓
Glutamine	91 ↓

Health

Stomach pains

● ● ● ● ● ✓ very good
● ● ● ● ● - improvable

Stomach pain is a symptom. From a medical and scientific perspective, it is currently impossible to distinguish between short-term complaints and chronic symptoms using microbial analysis. Therefore, we cannot give an overall assessment here.

Description

One of the most common and unspecific symptoms is abdominal pain. It can be quite diverse, such as dull, stinging or crampy, diffuse or focal, acute or chronic. Chronic abdominal pain can be an indicator of an irritated bowel (irritable bowel syndrome). Whereas acute abdominal pain is, in most cases, caused by infections. Some abdominal pain is associated with bacteria. ¹⁵⁴

Associations

Associated bacteria	Your result	Protective bacteria	Your result
✓ Bifidobacterium 120 154 168	Low	- Akkermansia muciniphila 91	Low
✓ Blautia 154	Normal	✓ Prevotella 154	High
✓ Streptococcus 154	Low		

i Peppermint: menthol, a compound found in mint, helps reduce muscle cramps in your intestines, as well as pain.

Flatulence and bloating

● ● ● ● ● ✓ very good
 ● ● ● ● ● – improvable

Flatulence and bloating are symptoms. From a medical and scientific perspective, it is currently impossible to distinguish between short-term complaints and chronic symptoms using microbial analysis. Therefore, we cannot give an overall assessment here.

Description

Flatulence and bloating are symptoms. They occur when there is too much gas in the intestine, which is caused by the fermentation of food components and the metabolic processes of your intestinal bacteria. It is called flatulence as soon as the gases escape through the anus. These can sometimes have a strong smell. Bloating (= meteorism) occurs when the gases cannot escape via the anus as wind. Bloating describes an inflated abdomen and can cause severe abdominal pain. ^{156,157,158}

Causes

Both symptoms are often triggered by hasty eating habits, whereby a lot of air is swallowed. Further causes include poor diet, psychological factors, hormones (during menstruation & pregnancy), as well as irritable bowel syndrome. Very rich, greasy or sweet food and excessive coffee and alcohol consumption can significantly influence the development of bloating as well as alter your microbiome. Moreover, sugar substitutes such as sorbitol or xylitol, which are found in many diet, light and sugar-free products, can promote these symptoms. Some bacteria are associated with bloating or flatulence.

Associations

Associated bacteria	Your result	Protective bacteria	Your result
✓ Blautia 99 121	Normal	✓ Oscillospira 121	High
✓ Coprococcus 121	Normal		
✓ Desulfovibrio 99 118	Low		
✓ Phascolarctobacterium 121	Normal		

i Ginger contains essential oil and bitter substances. These stimulate digestive activity in the stomach and intestine which can help let the accumulated air in the intestine escape.

Constipation

● ● ● ● ● ● ● ● ✓ very good
● ● ● ● ● ● ● ● - improvable

Constipation is a symptom. From a medical and scientific perspective, it is currently impossible to distinguish between short-term complaints and chronic symptoms using microbial analysis. Therefore, we cannot give an overall assessment here.

Description

Constipation is already accepted as a lifestyle disease and one of the most common complaints in industrialized countries. Constipation is characterized by having less than three bowel movements per week. A distinction is made between acute and chronic constipation. For the most part, constipation is considered harmless. However, it can also be a symptom of other diseases (e.g. irritable bowel syndrome, colonic inertia, changes or disorders of the rectum).¹²⁴

Causes

Constipation is often caused by a lack of daily physical activity, one's diet or hydration level. Some bacteria can be associated with constipation.

Associations

Associated bacteria	Your result	Protective bacteria	Your result
✓ Butyricimonas 32	Normal	✓ Faecalibacterium prausnitzii 32 102 122	Normal
✓ Coprococcus 32 122	Normal	✓ Lactococcus 32	Normal
✓ Phascolarctobacterium 32	Normal	- Roseburia 32 104 122	Low
✓ Ruminococcus 101 104 123	Low		
✓ Veillonella 18	Low		

i Figs contain laxatives, which help to relieve constipation and thus stimulate healthy digestion.

Diarrhea

● ● ● ● ● ● ✓ very good
● ● ● ● ● ● ● ● ● ● - improvable

Diarrhoea is a symptom. From a medical and scientific perspective, it is currently impossible to distinguish between short-term complaints and chronic symptoms using microbial analysis. Therefore, we cannot give an overall assessment here.

Description

Diarrhea is a common symptom and is determined by stool frequency and stool composition. In adults, diarrhea occurs when bowel movements occur more than three times a day. The consistency must be fluid and accompanied by a strong urge to pass a bowel movement. Diarrheal diseases are usually accompanied by vomiting, nausea and a loss of appetite. One differentiates between acute and chronic diarrhea.³³

Causes

Acute diarrheal diseases are often caused by gastrointestinal infections, perishable foods or intolerances. Chronic diarrheal diseases can often be associated with irritable bowel syndrome, food intolerances or metabolic diseases. Stress can also be a cause of diarrhea. Some bacteria can be associated with diarrhea.

Associations

Associated bacteria	Your result	Protective bacteria	Your result
✓ Bacteroides fragilis 30 31 35 101	Low	✗ Collinsella 104 105	Low
✓ Eggerthella 101 201	Low	✓ Faecalibacterium prausnitzii 308	Normal
✓ Parabacteroides 35 101	Low	✗ Lactobacillus 104 307	Low
✗ Prevotella 35 101	High		
✗ Slackia 101	High		
✓ Streptococcus 101 104	Low		

i The mucilage in the shells of psyllium seeds can bind a lot of water and thus serve as a swelling agent. They increase the volume of stool, exerting more pressure on the intestinal wall, which in turn stimulates intestinal peristalsis.

Intestinal mucosa



Good, easy to improve!



Your intestinal bacteria support your intestinal mucosa. With small improvements your intestinal bacteria can help regenerate the intestinal mucosa even more efficiently. Learn more about this in your personalized recommendations.

Description

The mucus of the intestinal mucosa serves as a protective layer. The production and breakdown of the mucus is stimulated by your bacteria. The mucus ensures that your intestinal bacteria keep enough distance to the mucous membrane, so as not to permanently irritate the local immune cells thereby triggering an inflammatory process and disrupting the barrier function. When your bacteria are imbalanced, it can lead to increased degradation of the mucus, which results in a reduction of this important protective layer. One type of intestinal barrier disorder is the so-called "leaky gut". In this case, the increased intestinal permeability is due to loosened tight junctions between the mucosal cells in the small intestine. This creates unwanted gaps that allow small amounts of toxins to overcome your intestinal barrier and thus enter your bloodstream.^{89,90,167}

Risk factors

Among the triggers of Leaky Gut are infections, medication, chronic inflammations, consumption of toxins, such as smoking, alcohol, sugar-rich food, as well as a changed composition of bile acids.

Associations

Associated bacteria	Your result	Protective bacteria	Your result
✓ Collinsella 191	Low	✗ Akkermansia muciniphila 61 91 97	Low
✓ Pseudomonas 86 167	Normal	✓ Bifidobacterium bifidum 92 93 94	Normal
✓ Salmonella enterica 41 42	Normal	✓ Catenibacterium 50	Normal
✓ Sutterella 87 177	Normal	✓ Faecalibacterium prausnitzii 34 36 49	Normal
		✓ Prevotella 49 96	High
		✗ Roseburia 173 174	Low
		✗ Ruminococcus gnavus 97 98	Low

i The most important measure for a healthy intestinal mucosa is a balanced diet. Your diet should be rich in healthy fatty acids, fiber, vitamins and minerals to help calm your bowels and stop inflammation.

Irritable bowel syndrome



Good, easy to improve!



Most intestinal bacteria associated with irritable bowel syndrome are within average levels.

Description

Irritable bowel syndrome is a functional disorder of the digestive system. Although this disorder is not life threatening, it often reduces the quality of life. This usually manifests itself in constipation, diarrhea and pain. Reasons for this might be problems in digestion and absorption (e.g. problems with bile acid), a disturbed protective barrier of the intestinal mucosa (intestinal permeability), the microbiome, immune modulations and inflammations, as well as the nervous system. There is a so-called "second brain" in your gut, the enteric nervous system, which is in constant communication with your head via the gut-brain axis. When you are stressed a number of different circuits, which are communicated across the gut-brain axis, get stressed. Thus, your microbiome significantly influences the development of inflammatory processes in your intestine via immune changes caused by intestinal mucosal damage and bacterial imbalances.^{101,171}

Risk factors

There are many factors that can cause irritable bowel syndrome. Stress and emotions are often associated with this disorder. Other triggers that may aggravate the symptoms and also amplify the causes listed above include malnutrition and lack of nutrients, other diseases, toxins, lack of gastric acid, medication, infections and a bacterial imbalance.

Associations

Associated bacteria	Your result	Protective bacteria	Your result
✓ Blautia 101 201	Normal	✗ Akkermansia muciniphila 91 178	Low
✓ Coprococcus 100 310	Normal	✗ Bifidobacterium 100 102 104 108 168 309	Low
✓ Dialister 37 101	Low	✗ Collinsella 18 35 104 105 311	Low
✓ Dorea 101 104	Normal	✓ Faecalibacterium prausnitzii 109 152 178 201 308	Normal
✓ Enterobacteriaceae 101 103	Low	✓ Odoribacter 101 152	Normal
✓ Roseburia 101 104	Low	✓ Prevotellaceae 37 201	High
✓ Ruminococcus 100 101 104 105 106 107	Low		
✓ Salmonella 40 170	Normal		
✓ Veillonella 177 309	Low		

i Unfortunately, you can't relax at the touch of a button. Likewise, there is no "proper nutritional behavior" for irritable bowel syndrome because it needs to be individually adjusted. However, one can begin with small steps, such as being calm while eating and having 5 meals a day.

Gut-brain axis



Good, easy to improve!



You seem to have everything under control! Your intestinal bacteria are trying to support you in the best possible way. Try to reward them a little more by following your personalized recommendations.

Description

Gut over head! Your gut is home to over 100 million nerve cells that lead directly to the brain. That's even more nerve cells than those that lead from the brain to the entire body. This means that your gut is constantly exchanging information with your brain. The nervous system of your gut uses the same neurotransmitters (information carriers between cells) as your brain. Neurotransmitters play an important part in mental illness, such as depression. Your microbiome is also an indispensable player, because the metabolism of your bacteria in the digestive tract can disturb the balance of brain messengers such as norepinephrine, dopamine or serotonin and thus influence your frame of mind.^{146,153,172}

Risk factors

There are usually many factors that can contribute to listlessness or depression. Often, they are physical or circumstantial causes such as chronic illness, hormonal imbalance, permanent stress and conflicts, loneliness or other misfortunes.

Associations

Associated bacteria	Your result	Protective bacteria	Your result
✓ Actinomycetaceae 38 99	Normal	✗ Bifidobacterium 114 117 182 183	Low
✓ Anaerostipes 41 153 180	Normal	✓ Coprococcus 112	Normal
✓ Anaerotruncus 100 181	Low	✗ Dialister 112 153	Low
✓ Bacteroides 39 41 100	Low	✓ Dorea 41 113	Normal
✓ Blautia 153 180	Normal	✓ Faecalibacterium 110 111 153	Normal
✓ Lachnospiraceae 100 153 180	Normal	✗ Lactobacillus 112 114 115 116 117	Low
✓ Verrucomicrobia 180 181	Low	✗ Ruminococcus 41 111 153	Low

i Our gut communicates closely with our brains, so we can actually influence our disposition a little bit through food. Omega-3 fatty acids, folic acid and vitamin B enhance our mental performance.

Gut-heart axis



Good, easy to improve!

● ● ● ● ● ● ● ✓ very good
● ● ● ● ● ● ● ● - improvable

Most gut bacteria that are associated with a healthy gut-heart axis are doing alright. That's good. To strengthen your intestinal-heart-axis further we have a few suggestions. These can be found in your personalized recommendations.

Description

Diseases of the vascular system and/or the heart (cardiovascular diseases) affect approximately one third of the population. Recently, it has been shown that the microbiome is involved in the development of such diseases.

Risk factors

Bacteria metabolize certain substances such as choline and L-carnitine (contained in eggs and milk) to trimethylamine. These are then converted into trimethylamine N-oxides (TMAO) in the liver. TMAO promotes the absorption of cholesterol and can thus contribute to the development of cardiovascular diseases. In addition, a disturbed barrier function of the intestinal mucosa (see Leaky Gut) can trigger an inflammatory cascade. Metabolic products of bacteria can penetrate the blood circulation system and contribute to the development of atherosclerosis (deposition of fat, blood clots, connective tissue and calcium in the blood vessels) and heart failure (weakness of the heart muscle).^{42,43,44}

Associations

Associated bacteria	Your result	Protective bacteria	Your result
✓ Collinsella 202	Low	- Bacteroides 203	Low
✓ Enterobacter 203 205	Normal	✓ Blautia 45 203	Normal
✓ Megamonas 205	Normal	✓ Faecalibacterium 202 203	Normal
✓ Streptococcus 203	Low	- Roseburia 83 202 203 204	Low



A low-fat diet helps to improve your bowel-heart axis.

Gut-liver axis



Good, easy to improve!



Your gut bacteria support the functions of your liver. Help your gut bacteria continue in doing their job well by following your personalized recommendations.

Description

Your liver is the most important metabolic organ and its health is crucial for your quality of life. As the detoxification center of the body, it frees you from alcohol, nicotine, sugar and medication. In addition, it performs important metabolic tasks such as the production of coagulation factors and bile. How much the liver is used on a daily basis depends, among other things, on a healthy intestinal function. Your intestine and liver are in constant contact and are connected via the blood circulation (portal vein). Nutrients and bacterial components are released into the liver via this large blood vessel. In this analysis, we focus on the association between non-alcoholic fatty liver and intestinal bacteria.^{84,161,221}

Risk factors

Risk factors for an imbalance of the gut-liver axis are often an unhealthy lifestyle and medication. Often an imbalance of the gut-liver axis occurs as a side effect of chronic disease.

Associations

Associated bacteria	Your result	Protective bacteria	Your result
✓ Alcaligenaceae 125 126	Normal	✓ Coprococcus 66 142 144	Normal
✓ Dorea 66 145	Normal	✓ Lachnospiraceae 66 125 126	Normal
✓ Enterobacteriaceae 125 126	Low	✓ Odoribacter 128 142	Normal
✓ Fusobacteriaceae 125 126	Normal	✓ Oscillospira 85	High
✓ Lactobacillus 66 85 185	Low	✓ Prevotella 128 129	High
✓ Megasphaera 85 125 126 176	Normal	– Roseburia 66 144	Low
✓ Peptoniphilus 144 145	Normal	✓ Ruminococcaceae 65 66 125 126 128 130	Normal
– Porphyromonas 125 126 127 144	High		
✓ Streptococcus 85 128 179	Low		



A healthy liver increases your quality of life and performance. Liver damage develops slowly and over many years, so support your liver. Avocados contain many antioxidants and glutathione that support liver function.

Metabolic syndrome



Good, easy to improve!



Most gut bacteria that are scientifically associated with obesity are within normal levels. That's good! You can strengthen your bacteria a little more by following your personalized recommendations.

Description

Our body is subject to the laws of thermodynamics. Therefore, an "excess" of unneeded calories leads to weight gain. This in turn can lead to obesity (nutritional and metabolic disease with severe overweight - BMI > 30kg/m²). As a result, diseases such as insulin resistance, atherosclerosis (fat deposits in the artery walls) and hormonal problems can develop. Above all, however, your microbiome also suffers from this imbalance. Your intestinal bacteria are essentially involved in the utilization of your food and influence how many calories are gained from the food. In this analysis we have focused on the association of your intestinal bacteria with obesity.^{76,77,78,138,140,172}

Risk factors

Unhealthy living and eating habits are the main cause of metabolic syndrome. Often there is also a genetic predisposition that can be promoted by an unhealthy lifestyle. In addition to a high-fat and high cholesterol diet, other risk factors include increased alcohol consumption, smoking and lack of physical activity.

Associations

Associated bacteria	Your result	Protective bacteria	Your result
✓ Actinomyces 20 138	Normal	– Akkermansia muciniphila 60 61 62 63 137	Low
✓ Adlercreutzia 138	Low	– Anaerotruncus 56 64	Low
✓ Lactobacillus 22 23 47	Low	– Bacteroides fragilis 47 199	Low
– Prevotella 65 159	High	– Dialister 214	Low
✓ Ruminococcus 60 137	Low	✓ Lachnospira 20 137	Normal
		✓ Oscillospira 66 138	High

i Saturated fatty acids increase blood lipids, which has a negative effect on cardiovascular health and increases the risk of metabolic syndrome. Try to reduce these. Saturated fatty acids are found mainly in milk chocolate, fatty meats and sausages, coconut oil and readymade meals.

Insulin balance



Good, easy to improve!



Your intestinal bacteria support you in the absorption and utilization of sugar! That's very good. You can further support your bacteria with a few tips in your personalized recommendations.

Description

A disorder of blood sugar metabolism means that your body can no longer properly transport the glucose it absorbs from a meal – such as sugar or certain carbohydrates – into your cells with the help of insulin, where it serves to supply energy. Insulin is a hormone produced by the pancreas that regulates blood sugar levels in the body. Normally, the glucose level in the blood drops again after eating. The speed at which this happens indicates how well your cells respond to insulin. However, if these values do not drop within a certain period of time, there may indicate a blood sugar disorder. This means that your cells no longer respond sufficiently to insulin. The sugar accumulates in the blood vessels, which can cause health problems. Your gut bacteria influence the absorption and utilization of sugar and thus your blood sugar levels. ^{79,81,82,164}

Risk factors

Lack of exercise, overweight and stress often lead to a disturbance of the insulin balance. However, lack of sleep, smoking and medication could also be involved in the development of such a disorder.

Associations

Associated bacteria	Your result	Protective bacteria	Your result
✓ Bacteroides 72 74	Low	– Bifidobacterium 72 73 74	Low
✓ Betaproteobacteria 75	Normal	✓ Blautia 70 72 151 166	Normal
✓ Collinsella 69	Low	✓ Butyricimonas 73	Normal
✓ Eggerthella 68 69 72	Low	– Erysipelotrichaceae 68 166	Low
✓ Lactobacillaceae 79	Low	✓ Firmicutes 70 75 79 190	Normal
✓ Ruminococcus 70 166	Low	✓ Lachnospiraceae 68 70 166	Normal
✓ Veillonella 72 73 165	Low	✓ Megamonas 70	Normal
		– Roseburia 68 70	Low



A balanced diet with complex sugars, such as whole meal products, can help control and strengthen the insulin balance. Whole grain products also contain important fibers, vitamins and minerals.

Kidney stones



Excellent!

● ● ● ✓ very good
● ● ● – improvable

The gut bacteria associated with the formation of kidney stones are well within normal levels! That's optimal!

Description

Your kidneys produce your urine. Urine is used to excrete water-soluble substances such as harmful metabolites or drugs together with water. They also stabilize your blood pressure by monitoring the volume of fluid in your body. In addition, your kidneys also control the salt content in your body, because too much salt increases the amount of fluid, which in turn increases blood pressure.

Your gut bacteria help convert your food into metabolic products that can be further processed, so that your kidneys have less work to do. ¹³⁶

Risk factors

An example is oxalates. Oxalates are compounds of oxalic acid and potassium, calcium or magnesium found in your food. They are metabolized by certain bacteria in your gut. If the bacteria are unable to break down oxalates adequately, oxalates will be transported to your kidneys where they form unpleasant kidney stones. This analysis describes the association of intestinal bacteria with the utilization of oxalates.

Associations

Associated bacteria	Your result	Protective bacteria	Your result
✓ Bacteroides 131	Low	✓ Oxalobacter formigenes 120 132 133 134 135	High
		✓ Prevotella 135 206	High



You can reduce the formation of oxalates in your body by drinking plenty of still water.

Gallstones



Good, easy to improve!

● ● ● ● ● ✓ very good
● ● ● ● ● ● - improvable

Most gut bacteria that are associated with the formation of gallstones are within average levels. That's good! In order to continue supporting your bacteria, we have a few recommendations for you in your personalized recommendations.

Description

Gallstones often occur in people over 40 years old. Women in particular often suffer from gallstones. Almost 90% of diagnosed gallstones are cholesterol gallstones. These consist of crystallized components of the bile fluid with an increased bile cholesterol content. Whether symptoms occur is strongly related to the size and location of the gallstones. Possible symptoms include unpleasant, cramp-like upper abdominal pain that occurs in waves, or bloating, flatulence, nausea, and belching. Your intestinal bacteria are involved in regulating the bile acid recycling process and may even alter the properties of the bile acid. This is related to your diet and the metabolic activity of your bacteria. An imbalance of the bacteria can thus promote gallstone formation.^{209,217,218}

Risk factors

Risk factors for gallstones include a cholesterol-rich diet, elevated blood fat levels and metabolic diseases.

Associations

Associated bacteria	Your result	Protective bacteria	Your result
✓ Bilophila 88 177	Low	✓ Bacteroides uniformis 208	Normal
- Oscillospira 208 209	High	✓ Faecalibacterium 207	Normal
		✓ Lachnospira 207	Normal
		- Roseburia 88 177 207 208	Low

Joint health



Good, easy to improve!



Most gut bacteria associated with rheumatoid arthritis are within normal levels. That's good! To continue supporting your bacteria, we have a few suggestions for you in your personalized recommendations.

Description

Rheumatoid arthritis is an autoimmune disease that primarily affects the joints. It leads to constant inflammation and destruction of joints and bones because the body's immune system is directed against its own cell structures. The mechanism is very complex and depends on innate and acquired immune responses. The permeability of your intestinal mucosa and microbial imbalances play a role, because they can throw the immune system off balance.²¹⁹

Risk factors

Rheumatoid arthritis is the result of genetic, environmental and hormonal factors, with bacterial and viral components identified as the most common potential pathogens.

Associations

Associated bacteria	Your result	Protective bacteria	Your result
✓ Bacilli 189	Low	– Bacteroides 186 196	Low
✓ Collinsella 191 193	Low	– Bacteroides fragilis 187 188 190	Low
✓ Eggerthella 191 194	Low	– Bifidobacterium 187 188 190	Low
– Prevotella copri 186 192 195 220	High	✓ Faecalibacterium prausnitzii 189 191	Normal
		✓ Flavobacterium 189	Normal
		– Roseburia 175	Low

i An increased consumption of coffee (5-10 cups per day) can promote the development of rheumatoid arthritis. A reduction in coffee consumption is therefore beneficial.

Improvement suggestions

About the recommendations

We have listed many recommendations for your improvement here. Not all of them will apply to you. Food intolerances and personal preferences have not been taken into account in the recommendations. Try to find out which ones are best for you and which ones you can easily integrate into your everyday life.

Personal recommendations

Eat more L-glutamine (meat, dairy, spinach, parsley) — *Intestinal mucosa*

L-glutamine helps build up the intestinal mucosa. L-glutamine is included in the following foods: beef, chicken, fish, dairy, beans, parsley and spinach. ^{255,256}

Relieve the inflammation — *Irritable bowel syndrome*

Try to relieve inflammation in your intestine. The following spices may help you: turmeric, frankincense extract (*Boswellia serrata*), juniper, chamomile and sage. ³²⁴

Tryptophan (pumpkin seeds, dates, avocados) helps — *Gut-brain axis*

Tryptophan is an essential amino acid that can be converted into serotonin (= neurotransmitter). Tryptophan can help reduce repressive moods, anxiety, and stress and improve performance. Tryptophan is found in the following foods: tuna, pumpkin seeds, amaranth, dates, avocados, strawberries, figs and papayas. ^{267,268,269}

Anthocyanins (grapes, eggplant, red cabbage) support — *Gut-heart axis*

Anthocyanins are powerful antioxidants. They prevent premature cell aging and help the heart avoid the formation of blood clots. Anthocyanins are present in blue and purple vegetables and fruits, e.g. in blueberries, blackberries, elderberries, grapes, raisins, eggplants, prunes, figs, plums, lavender and red cabbage. ^{301,302}

Choose omega-3 fatty acids (fish, linseed oil, nuts) — *Gut-liver axis*

Omega-3 fatty acids are unsaturated fatty acids and essential for a healthy liver and healthy blood lipid levels. This reduces cholesterol levels and reduces the risk of hypertension and diabetes. Linseed oil, walnuts and fish are rich in omega-3 fatty acids. ^{260,262,263,264}

Choose food and drinks with high levels of polyphenols — *Diversity*

Polyphenols are antioxidants that act as fuel for your gut microbes. They help to foster the diversity of your microbes. Examples are nuts, seeds, berries, olive oil, brassicas, coffee and tea – especially green tea. ^{313,314}

Eat more antioxidants (cinnamon, almonds). — *Lipid metabolism*

Antioxidants such as eugenol, cinnamaldehyde, linalool and camphor protect the body from free radicals and support your metabolism. In addition, they minimize the risk of irritation of the digestive tract. Examples of foods that contain antioxidants are blueberries, cinnamon and almonds. Furthermore, cinnamon stimulates fat burning. Almonds contain a lot of vitamin E and fibre. ^{252,254}

Strengthen your vitamin balance (potatoes, beef, leafy vegetables, tomatoes) — *Vitamin metabolism*

Support your bacteria by giving them certain vitamins. For example, vitamin B6 is found in high amounts in fish, milk, carrots and potatoes. Vitamin B6 helps your body release energy in the form of sugar from stored carbohydrates and form red blood cells. Folic acid is found mainly in beef, liver, peas, spinach and asparagus and is an important factor for well-functioning cell division. Vitamin K, a component of leafy vegetables, soybeans and squash, is needed for blood clotting and bone development. Lipoic acid, which is involved in most enzyme reactions and affects insulin processing, is found mainly in meat products, spinach, broccoli and tomatoes.

Use coconut oil for cooking — *Protein metabolism*

Coconut oil is relatively high in medium-chain fatty acids. These can boost your metabolism much better than long-chain fatty acids. However, use coconut oil only in moderation, because it contains many saturated fatty acids. ^{318,319}

Coenzyme Q10 (red meat, soy beans, broccoli) stimulates your metabolism — *Sugar metabolism*

Coenzyme Q10 is important for your energy production. It is a fat-soluble, body-own substance that can be supplied through the food though is also synthesised by the body itself. Olive oil, beef, sardines, soybeans and broccoli contain a high concentration of coenzyme Q10. ^{320,321}

Strengthen your metabolism (green tea, guarana) — *Metabolic syndrome*

Green tea and guarana can boost your metabolism. In addition, both contain antioxidants that have an additional positive effect on the metabolism. Green tea in particular has also an anti-diabetic effect, positively affecting glucose and lipid metabolism and increasing glucose tolerance. ³³¹

Blueberries, ginko and ginseng support you — *Insulin balance*

Blueberries and ginseng have an anti-diabetic and hypoglycemic effect on your body. Moreover, ginko promotes local microcirculation and hence has a positive effect on your insulin balance. ^{333,334,335}

Pay attention to your vitamin C & D levels — *Gallstones*

Gallstones can often be associated with a reduced absorption of nutrients. In particular, the vitamin household can be affected. A lack of vitamin C can even contribute to the formation of gallstones. Therefore, try to get enough vitamins. ^{339,340,341}

Calcium and manganese support you — Joint health

Calcium is a key nutrient for bone metabolism and is therefore important for the stabilization of your joints. Manganese is a coenzyme of glycosyltransferase. This is involved in the formation of proteoglycans of the cartilage and connective tissue. Calcium is found in broccoli, chard, fennel as well as in milk and cheese products. Manganese is found in many plant foods, such as cereals, legumes, rice and leeks. ³⁴²

Enterotype 2 — Enterotypes

You probably eat a diet based primarily on plant-based carbohydrates. Plant-based diets harbor many benefits for your body - for example, a balanced diet rich in fruits, vegetables, and whole grains protects against conditions such as obesity, high blood pressure, and atherosclerosis.

Your enterotype prefers many different vegetables and fruits (the more diverse, the better)

Your enterotype needs adequate protein intake - your requirement is 0.8 g protein/kg body weight. Good sources of protein are meat, fish, eggs, dairy products and many plants (especially legumes such as peas, lentils, beans, chickpeas...). Regarding animal products it is important to consider to choose a good quality!

According to your enterotype, complex carbohydrates (whole spelt bread, wild rice, whole wheat pasta) are preferable to simple carbohydrates (white bread, pasta, rice).

Regarding fat consumption, a diet with more unsaturated fatty acids (nuts, flax oil, avocado) than saturated fatty acids, as found in manufactured products, animal foods and hydrogenated fats, would do your body good.

Based on your enterotype, it appears that adequate vitamin B12 (cobalamin) would be important.

The more diverse the fruits and vegetables, the better for your enterotype

Support with B vitamins — Gut-skin axis

B vitamins are essential for the regeneration process of the skin. Mainly, vitamin B6, vitamin B12 and biotin are essential for wound healing and epidermal differentiation processes. Additionally, B vitamins have stimulating effects on the metabolism. The following foods contain high levels of vitamin B: bananas, peas, oranges, red peppers, green vegetables (cabbage sprouts, green beans, lamb's lettuce), whole grain products, bananas, potatoes, soybeans, wheat germ, hazelnuts and walnuts. Try to incorporate those into your daily routine. ^{329,330}

General recommendations

Microbial health

The following tips will help you to improve your microbial health:

Probiotic foods support.

Probiotic foods contain different strains of bacteria that support the regeneration of the intestine. Examples of probiotic foods are buttermilk, kefir, raw cheese, kombucha and natural yoghurt.

Prebiotic foods help.

Prebiotic foods help your bacteria because they contain fibres and nutrients, which play an essential role in the regeneration of your intestinal mucosa. Foods considered to be prebiotic are e.g. asparagus, artichoke, banana, chicory, eggplant, honey, leek, onion and Jerusalem artichoke. Try to incorporate them into your daily food intake (of course, only those that you can tolerate!).

Eat more fermented foods.

Bacteria in fermented foods support the species richness and variety in your gut: natural yoghurt, fresh sauerkraut, kefir, miso. ^{236,246,270,271,78,225,226}

Abdominal pain

For abdominal pain the following recommendations can provide relief:

Menthol (peppermint) helps with cramps.

Menthol helps with muscle spasms in the gut and can reduce pain. Menthol stimulates the influx of calcium into smooth muscle cells, thereby relaxing them. In addition, menthol activates an "anti-pain channel" in the walls of the colon. This can dampen the perception of pain by sensitization. Menthol occurs naturally in peppermint. So, try some fresh mint tea. But be careful with the dosage in case you are prone to reflux!

Thymol and carvacrol (thyme) have a supporting effect.

Thymol and carvacrol are essential oils that are found mainly in thyme. Thyme also has a high content of lamiaceaceous tannins and flavonoids. Thyme has a calming effect on the digestive system and additionally supports the cleansing of your intestines.

Alliin (garlic) relieves abdominal pain.

Garlic, a prebiotic with the main active ingredient Alliin, contains essential oils and flavonoids, as well as vitamins and minerals. This bulbous plant not only benefits our immune system, but also ensures the buildup of bacteria in the intestine. Garlic has proven antibiotic, antiviral and anti-inflammatory properties. Even abdominal pain can be reduced. But beware! Garlic also contains Phenprocoumon and warfarin. These substances have an anticoagulant effect! ^{239,240,241,242,243,244,245,246,247}

Flatulences and bloating

If you regularly suffer from flatulences try these tips:

Bitter compounds and essential oils (ginger) have a supporting effect.

Bitter compounds and essential oils are contained in ginger, for example. They activate the intestinal peristalsis and can thus relieve flatulence. In addition, ginger supports your metabolism. Try adding ginger tea or fresh ginger to your meals. Nowadays, ginger roots are readily available in almost every supermarket.

Avoid carbonated drinks.

Try to reduce coffee, soft drinks and carbonated drinks. These encourage flatulence and a swollen abdomen.

Cuminaldehyde (caraway, fennel) is good for you.

Cuminaldehyde supports the formation of digestive juices, such as saliva, gastric juice, bile secretions and pancreatic juice, which has a positive effect on your digestive processes and thus improves them.

Cuminaldehyde thereby alleviates especially flatulence and is found in e.g. caraway, cumin seeds (cumin) or fennel. Dietary fibres, such as legumes, become more digestible by the addition of cumin. ^{248,252,254,261}

Constipation

The following tips will help to get constipation under control:

Try a stomach massage.

Massage your stomach for at least 5 minutes. Lie on your back and lightly drum your fingertips on your abdomen. This stimulus transfers to the abdominal organs and stimulates the intestinal activity.

Oleuropein (olive leaf extract) is good for you.

Oleuropein is an active ingredient which can be found e.g. in olive leaf extracts. It helps calm the stomach and intestines, promotes regular bowel movements and the elimination of toxins.

Sea buckthorn is a miracle cure.

Sea buckthorn is a true miracle cure. It contains larger amounts of vitamin B1 and B6, which are needed for a functioning nervous system. A lack of vitamins can cause digestive problems. Sea buckthorn has a strong laxative effect, as it stimulates the intestinal movement. In addition, it detoxifies the mucous membranes and calms it. Just try some delicious sea buckthorn tea or juice! ^{249,250,251,253,287,288,289}

Diarrhea

Diarrhea can significantly affect everyday life, the following recommendations will help:

Try water-binding mucilage (psyllium husks, rice, oats).

Water-binding mucilage helps solidify the stool. These can be found e.g. in cooked rice, rusks, oatmeal or in psyllium husks. Avoid a combination with flatulent foods, such as beans or cabbage.

Eat more starchy foods (bananas, grated apples).

Starchy foods promote a more solid stool production and can reduce the number of visits to the toilet. Look out for starchy foods that are free of substances that may further irritate your stomach or intestines. Starchy foods include bananas and grated apples.

Tannins (St. John's wort, dried blueberries) help.

Tannins cause a contraction of the mucous membranes by binding to proteins. As a result, diarrhea pathogens cannot get into the intestine as easily and less electrolytes are lost. Dried blueberries (and leaves), dried blackberries (and leaves), St. John's Wort and silverweed contain many tannins. From all of these you can brew wonderful teas. Tea leaves for making these teas can be found in most pharmacies. But keep in mind that fresh berries can have the opposite effect and have laxative properties.^{290,291,312}

About the test

About myBioma

In our digestive system, the microbiome is of particular importance for our health. The microbiome includes all bacteria, viruses, fungi and organisms that are not visible to the naked eye. It trains our immune system from birth and profoundly influences the development of many serious diseases such as diabetes, overweight, irritable bowel syndrome, Parkinson's and even colon cancer.

We - the myBioma team - develop easy to perform stool analysis tests and combine them with intelligent algorithms and a growing knowledge base.

The innovation lies in the unique combination of Next Generation Sequencing (NGS) with a growing knowledge base on the interactions of the microbiome with the human organism.

Methods & restrictions

With the myBioma self-test, bacterial DNA is extracted, a marker gene present in all bacteria is amplified by polymerase chain reaction (PCR) and subsequently analysed by NGS. The sequence data are processed using a phylogenetic analysis algorithm. This analysis leads to the identification of your bacterial microbiome.

Our scientific cooperation partner is the medical university of vienna. The extraction and sequencing steps are performed using a standardized protocol in order to generate comparable data. The development of the analysis test, bioinformatic analysis and interpretation of the data after sequencing is performed by myBioma. That way we ensure a standardization of the process steps, which is essential for the microbial examination and enables comparison with follow-up examinations.

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