



Test report



At-home test



Gut Microbiome Test XL

Lab test

Stool

Name: **Sample Report** Date of test: **07/06/2023** Analysis-ID: **DUMMY-12**

Table of contents






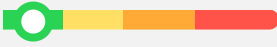



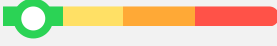



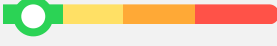




○ Determination of aerobic bacteria	page 7
○ Determination of anaerobic bacteria	page 10
○ Mycological stool examination	page 11
○ pH-value	page 12
○ Digestive residues	page 12
○ Detection of indigestion	page 12
○ Detection of malabsorption	page 13
○ Mucosal immunity	page 15
○ Leaky gut	page 15
○ Stress and food intolerance	page 16

Your test results







How to interpret your results


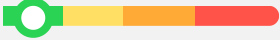
If the arrow on the scale is within the green area, your value is good. If the arrow is within the yellow, orange or red area, it indicates a deviation. Some parameters can not be set too high or too low, in which case the scale starts or ends on the green area, this is completely correct. For an explanation of the various parameters, please see Part 2 entitled Extended information.

Determination of aerobic bacteria







Name	Your value	Unit	Reference value	Scale
Escherichia coli	 $4,0 \times 10^7$	CFU/g stool	$10^6 - 10^7$	
Escherichia coli Biovare	 $< 1,0 \times 10^4$	CFU/g stool	$< 1,0 \times 10^4$	
Proteus spp.	 $< 1,0 \times 10^4$	CFU/g stool	$< 1,0 \times 10^4$	
Klebsiella spp.	 $< 1,0 \times 10^4$	CFU/g stool	$< 1,0 \times 10^4$	
Pseudomonas spp.	 $< 1,0 \times 10^4$	CFU/g stool	$< 1,0 \times 10^4$	
Enterobacter spp.	 $< 1,0 \times 10^4$	CFU/g stool	$< 1,0 \times 10^4$	
Serratia spp.	 $< 1,0 \times 10^4$	CFU/g stool	$< 1,0 \times 10^4$	
Hafnia spp.	 $< 1,0 \times 10^4$	CFU/g stool	$< 1,0 \times 10^4$	
Enterococcus spp.	 $< 1,0 \times 10^4$	CFU/g stool	$10^6 - 10^7$	

Determination of anaerobic bacteria

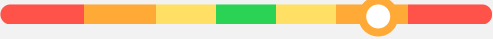
Name	Your value	Unit	Reference value	Scale
Bifidobacterium spp.	 $1,0 \times 10^8$	CFU/g stool	$10^9 - 10^{11}$	
Bacteroides spp.	 $5,0 \times 10^8$	CFU/g stool	$10^9 - 10^{11}$	
Lactobacillus spp.	 $< 1,0 \times 10^4$	CFU/g stool	$10^5 - 10^7$	

Name	Your value	Unit	Reference value	Scale
Clostridium spp.	 < 1,0 x 10 ⁵	CFU/g stool	< 1,0 x 10 ⁵	









Mycological stool examination

Name	Your value	Unit	Reference value	Scale
Candida spp.	 < 1,0 x 10 ³	CFU/g stool	< 1,0 x 10 ³	
Candida albicans	 < 1,0 x 10 ³	CFU/g stool	< 1,0 x 10 ³	
Yeast	negativ	Negative		
Geotrichum candidum	 < 1,0 x 10 ³	CFU/g stool	< 1,0 x 10 ³	


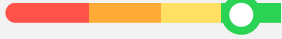


pH value

Name	Your value	Unit	Reference value	Scale
pH value	 7.30		5,8 - 6,5	


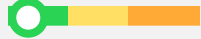


Digestive residues

Name	Your value	Unit	Reference value	Scale
Quantitative determination of fat	 7.30	g/100g	< 3,5	
Quantitative determination of nitrogen	 1.00	g/100g	< 1,0	
Quantitative determination of sugar	 3.20	g/100g	< 2,5	
Quantitative determination of water	 69.30	g/100g	75 - 85	


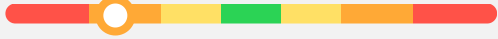
Detection of indigestion

Name	Your value	Unit	Reference value	Scale
Pancreatic elastase	 402.73	µg/g	> 200	
Bile acids in stool	 17.17	µmol/l	< 70	


Detection of malabsorption

Name	Your value	Unit	Reference value	Scale
Calprotectin	 17.90	mg/l	< 50	
Alpha-1 antitrypsin	 23.04	mg/dl	< 27,5	



Mucosal immunity

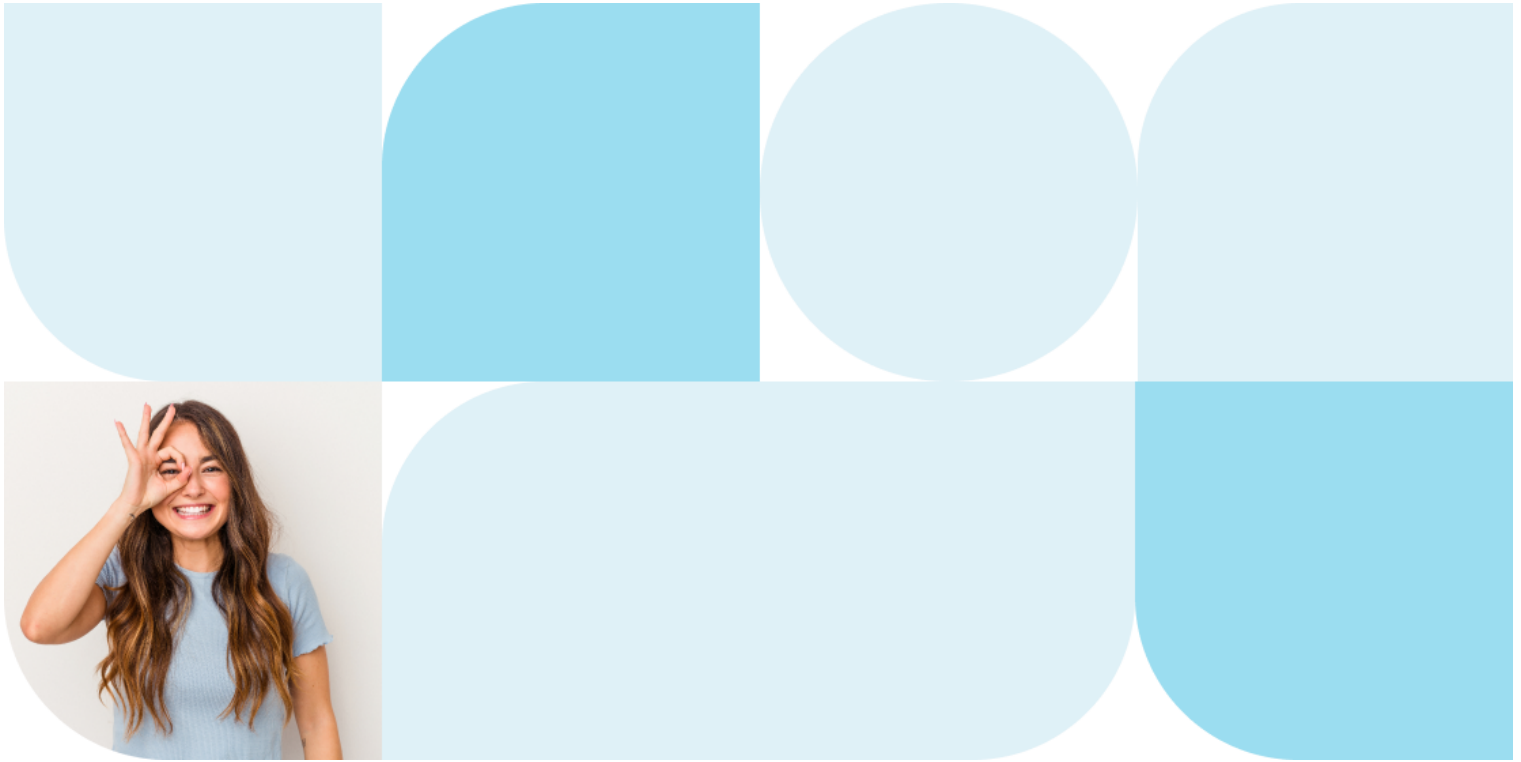
Name	Your value	Unit	Reference value	Scale
Secretory IgA	 234.15	µg/ml	510 - 2040	

Leaky gut

Name	Your value	Unit	Reference value	Scale
Zonulin	 91.73	ng/ml	< 55	

Stress load and food intolerance

Name	Your value	Unit	Reference value	Scale
Histamine	 5387.60	ng/ml	< 959	





Extended information

Explanation of your test results

The **microbiome** includes the bacteria and other microorganisms that are naturally present in the intestine. Our **microbiome** can have a broad impact on human health and disease. It modulates the immune system, provides the organism with vitamins, participates in the digestion of food components, supplies intestinal epithelium with energy by producing short-chain fatty acids and stimulates intestinal peristalsis.

Determination of aerobic bacteria

Escherichia coli



Name	Your value	Unit	Reference value	Scale
Escherichia coli	 4,0 x 10 ⁷	CFU/g stool	10 ⁶ - 10 ⁷	

Escherichia coli belongs to the **putrefactive bacteria**. Putrefactive bacteria are bacteria that thrive in an alkaline environment and produce ammonia. At high pH, they grow and can compete with other good bacteria.

Putrefactive bacteria primarily metabolize protein and fat, which produces toxic metabolites such as ammonia, indole, skatole and hydrogen sulfide. These can damage the intestinal mucosa and may lead to an increase in the pH of the colon (> 8.5) in the long run.

Elevated levels are often caused by **low** mast activity in the mucosal immune system. If the **microbiome** are characterized by an increased amount of putrefactive bacteria, women try to reduce the pH value in the intestine/lumen by supplementing with pre- or probiotics. This promotes the reconstruction of the **microbiome** with **good** bacteria and inhibits the growth of putrefactive bacteria. Less toxic metabolite byproducts are produced, which alleviates the damage on the intestine and other vital organs such as the liver and kidneys.



Escherichia coli Biovare

Name	Your value	Unit	Reference value	Scale
Escherichia coli Biovare	 < 1,0 x 10 ⁴	CFU/g stool	< 1,0 x 10 ⁴	

Escherichia coli Biovare are subgroups of **Escherichia coli** that does not normally occur in the intestine. There are several types such as hemolytic, mucosal and lactose negative E. coli. It is not uncommon to find hemolytic or mucosal E. coli while finding a favorable E. coli and alkaline pH.



Elevated levels can also be caused by **low** mast immune activity. This is mostly due to too low production of secondary IgM.

Proteus spp.

Name	Your value	Unit	Reference value	Scale
Proteus spp.	 < 1,0 x 10 ⁴	CFU/g stool	< 1,0 x 10 ⁴	



Elevated levels of Proteus species often occur in Crohn's disease and primary biliary cholangitis.

Klebsiella spp.

Name	Your value	Unit	Reference value	Scale
Klebsiella spp.	 < 1,0 x 10 ⁴	CFU/g stool	< 1,0 x 10 ⁴	



High levels of Klebsiella are associated with inflammatory activity in the intestine. Klebsiella can release toxins and may cause abdominal pain, bloating, general diarrhea. Elevated levels of Klebsiella is common after prolonged use of antibiotics.

Pseudomonas spp.

Name	Your value	Unit	Reference value	Scale
Pseudomonas spp.	 < 1,0 x 10 ⁴	CFU/g stool	< 1,0 x 10 ⁴	

Elevated levels of Pseudomonas species may occur in an infection of the intestine. Elevated levels can lead to diarrhea and loose stool.

Enterobacter spp.


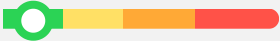
Name	Your value	Unit	Reference value	Scale
Enterobacter spp.	 < 1,0 x 10 ⁴	CFU/g stool	< 1,0 x 10 ⁴	

Enterobacter species belong to the gram-negative bacteria. Gram-negative bacteria are bacteria that thrive in an alkaline environment and produce enzymes. At high pH, they grow and can compete with other good bacteria. Gram-negative bacteria primarily metabolize protein and fat, which produces waste metabolites such as ammonia, indole, skatole and hydrogen sulfide. This can damage the intestinal mucosa and may lead to an increase in the pH of the colon (-4.5) in the long term.

Enterobacter species are common bacteria in soil and water and are often found in the intestinal tract of humans and animals. High levels are often associated with an inflammatory process in the intestinal mucosa. Enterobacter are opportunists that can occur as pathogens in hospitals where they cause infections in people with weakened immune systems.



If the intestinal area is characterized by an increased amount of putrefactive bacteria, attention try to reduce the pH value in the intestine/lumen by supplementing with pre- or probiotics. This promotes the reconstruction of the intestinal wall, which in turn inhibits the growth of putrefactive bacteria. Less toxic metabolite by-products are produced, which also reduce the damage on the intestine and other vital organs such as the liver and kidneys.

Serratia spp.

Name	Your value	Unit	Reference value	Scale
Serratia spp.	 < 1,0 x 10 ⁴	CFU/g stool	< 1,0 x 10 ⁴	


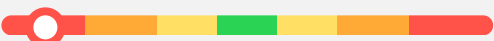
Elevated species occur in a variety of infections. Elevated levels also often occur in people with diarrhea.

Hafnia spp.

Name	Your value	Unit	Reference value	Scale
Hafnia spp.	 < 1,0 x 10 ⁴	CFU/g stool	< 1,0 x 10 ⁴	

Elevated levels of Hafnia species can occur in people with diarrhea and can cause illness in people with weakened immune systems.

Enterococcus spp.



Name	Your value	Unit	Reference value	Scale
Enterococcus spp.	 < 1,0 x 10 ⁴	CFU/g stool	10 ⁶ - 10 ⁷	

Enterococcus produces wide metabolic products and antimicrobial substances that prevent foreign bacterial colonization in the small intestine (parasites in small intestine's lumen).

Low levels promote the occurrence of endogenous infections by disrupting microbial barrier function.

Determination of anaerobic bacteria

Bifidobacterium spp.



Name	Your value	Unit	Reference value	Scale
Bifidobacterium spp.	 1,0 x 10 ⁸	CFU/g stool	10 ⁹ - 10 ¹¹	

Bifidobacteria are needed, among other things, to protect against potentially pathogenic microbes, for the synthesis of short-chain fatty acids and to stimulate IgA⁺ (gut-associated lymphoid tissue), so as to be able to break down complex carbohydrates and indigestible fiber. They are part of the acidifying flora and mainly use carbohydrates as their fuel substrate. They produce short-chain fatty acids (acetate and butyrate), which lower the pH value in the intestinal lumen and therefore inhibit the growth and spread of putrefactive bacteria.

Most **Bifidobacteria** are leaders in the formation of colonization resistance in the colon. **Bifidobacteria** develop a microbial barrier against infection by occupying mucosal receptors. These counteract the colonization and spread of pathogenic bacteria, yeast or parasites.

Low levels can be due to a disturbed intestinal mucosa or too low fiber intake. Excessive levels are rare. **Bifidobacteria** is a very common bacterial strain used in probiotics. **Bifidobacteria** is also well supported by prebiotics.

Bacteroides spp.



Name	Your value	Unit	Reference value	Scale
Bacteroides spp.	 5,0 x 10 ⁸	CFU/g stool	10 ⁹ - 10 ¹¹	

Bacteroides species belong to the genus *Bacteroides*. Their task is to break down indigestible fiber and produce butyrate/butyric acid.

As with **Bifidobacteria**, most **Bacteroides** have leads to development of colonization resistance in the colon. **Bifidobacteria** develops a microbial barrier against infection by occupying mucosal receptors. These counteract the colonization and spread of pathogenic bacteria, yeast or parasites.


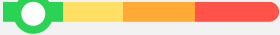
Too low levels of **Bacteroides** species influence a disturbed flora in the intestinal microbiome and can lead to overgrowth of other microbes. Too low levels can also reduce the production of short-chain fatty acids. A diet rich in fiber and prebiotics is recommended at low levels.

Lactobacillus spp.

Name	Your value	Unit	Reference value	Scale
Lactobacillus spp.	 < 1,0 x 10 ⁴	CFU/g stool	10 ⁵ - 10 ⁷	

Lactobacillus is a bacterial species that occur in the small intestine and form a microbial barrier in the small intestine and metabolite products that prevent foreign bacteria from colonizing in the small intestine. Too low levels can occur in, among other things, neurodermatitis, food allergy or food intolerances. Excessive levels can occur with impaired digestive capacity.

Clostridium spp.


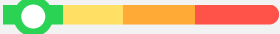
Name	Your value	Unit	Reference value	Scale
Clostridium spp.	 $< 1,0 \times 10^5$	CFU/g stool	$< 1,0 \times 10^5$	

Clostridium species contain over one hundred different subgroups. Most species are not relevant and can have positive effects on gastrointestinal health. Elevated levels may occur in people with autism, as well as in IBS. Even low levels can occur in people with IBS.

Mycological stool examination


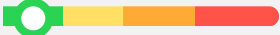
The mycological stool examination is used to detect any overgrowth of yeast and fungi. A possible fungal overgrowth is a result of unfavorable conditions in the intestine, which occurs in other diseases such as malabsorption of the intestinal contents.

Candida spp.

Name	Your value	Unit	Reference value	Scale
Candida spp.	 $< 1,0 \times 10^3$	CFU/g stool	$< 1,0 \times 10^3$	

Candida species are typically part of the normal fungal flora, but can become pathogenic in people with weakened immune systems and may cause yeast/fungal infections.

Candida albicans

Name	Your value	Unit	Reference value	Scale
Candida albicans	 $< 1,0 \times 10^3$	CFU/g stool	$< 1,0 \times 10^3$	

Candida albicans belong to the group of facultative pathogenic yeast which - under certain circumstances - massively multiply and can cause mucous mycosis. Candida albicans accounts for 80-90% of all Candida mycoses.

Objects that come in contact with human mucous membranes are often contaminated with yeast. To prevent recurrence of infections, toothbrushes, ear buds, dentures or bras should be disinfected regularly.



If the intestine is characterized by an increased amount of putrefactive bacteria, one can try to reduce the pH value in the intestine/lumen by supplementing with pro- or prebiotics. This promotes the reconstitution of the intestinal acid content and inhibits the growth of putrefactive bacteria. Lactic acid metabolite by-products are produced, which also reduce the damage on the intestine and other vital organs such as the liver and kidneys.

Yeast

Name	Your value	Reference value
Yeast	negativ	Negative

Yeast is a type of fungus that naturally occurs in the digestive system, but can cause disease if they overgrow. Negative = no overgrowth. Positive = overgrowth. Your result should be negative.


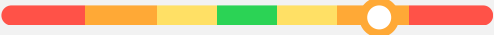
Geotrichum candidum

Name	Your value	Unit	Reference value	Scale
Geotrichum candidum	 < 1,0 x 10 ³	CFU/g stool	< 1,0 x 10 ³	

Geotrichum candidum is a saprophyte that can be isolated from soil, waste, uncooked vegetables, fruits and dairy products. This fungus is also often detected in saliva and stool.

Geotrichum can cause disease in the case of a weakened immune system, long-term antibiotic treatment or immunosuppressive treatment. This affects the oral cavity, nose and throat in addition to the effect on the intestine.

The properties of the stool

Name	Your value	Unit	Reference value	Scale
pH value	 7.30		5,8 - 6,5	

The pH value of the stool can indicate if there are any conditions of excess dairy or fat malabsorption in the intestine. A too low pH value often occurs in combination with a dysfunctional intestine - see, for example, sugars are metabolized to lactic acids, which can contribute to an acid stool. A too high pH value can be due to excessive amounts of protein, which can stimulate certain intestinal bacteria to produce ammonia and other metabolic products, thus raising the pH value of the stool.

An environment that is too alkaline (elevated pH) can be stabilized by the addition of pre- and probiotics, in combination with a diet rich in fat and low/moderate in fat and protein.


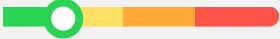
Digestive residues

Quantitative determination of fat

Name	Your value	Unit	Reference value	Scale
Quantitative determination of fat	 7.30	g/100g	< 3,5	



Elevated levels of fat in the stool may be due to diet (high fat diet) or indicate disorders of fat breakdown or absorption. It may be due to disturbances in bile secretion, bile acid absorption or incomplete secretion of lipolytic enzymes from the pancreas.

Quantitative determination of nitrogen

Name	Your value	Unit	Reference value	Scale
Quantitative determination of nitrogen	 1.00	g/100g	< 1,0	


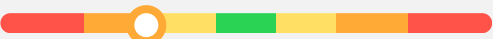
Elevated levels may indicate a disturbance in the breakdown or absorption of protein in the small intestine.

Quantitative determination of sugar

Name	Your value	Unit	Reference value	Scale
Quantitative determination of sugar	 3.20	g/100g	< 2,5	


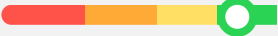
Elevated levels are often due to carbohydrate intolerance. Common causes are fructose malabsorption or lactose intolerance. Intolerance to lactose malabsorption may also be due to secondary pancreatic insufficiency with reduced secretion of carbohydrate-digesting enzymes.

Quantitative determination of water

Name	Your value	Unit	Reference value	Scale
Quantitative determination of water	 69.30	g/100g	75 - 85	


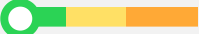
Low levels indicate a delayed passage through the intestine or constipation. Elevated levels indicate an accelerated passage or diarrhea/loose stools.

Pancreatic elastase

Name	Your value	Unit	Reference value	Scale
Pancreatic elastase	 402.73	µg/g	> 200	

Pancreatic elastase is a protease enzyme that is secreted by the pancreas and breaks down elastin, the specific protein in elastic fibers and digests other proteins such as fibrin, hemoglobin and albumin. Too low levels occur with weakened pancreatic function, pancreatitis, strictures and can occur in vegetarians/vegans.

Bile acids in the stool


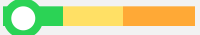
Name	Your value	Unit	Reference value	Scale
Bile acids in the stool	 17.17	µmol/l	< 70	

Bile acids are responsible for among other things the absorption of cholesterol, absorption of fatty acids and fat soluble vitamins in the small intestine and muscular bowel movements. Normally, approximately 97% of the bile acids are reabsorbed for reuse (enterohepatic recirculation). A possible disturbance in the enterohepatic recirculation leads to an increased secretion of bile acids and leads to secretion of Ca^{2+} and electrolytes in the small intestine in combination with an increased intestinal permeability and intestinal gas mobility leading to diarrhea.

Elevated levels indicate impaired ability of breaking down fat in the food.

Detection of malabsorption



Calprotectin

Name	Your value	Unit	Reference value	Scale
Calprotectin	 17.90	mg/l	< 50	

Calprotectin is a marker for inflammation in the gastrointestinal tract. Elevated levels may be due to certain drugs, bacteria, food allergies, intestinal infections, trauma, inflammatory bowel disease, polyps, diverticulitis or colorectal cancer. In case of prolonged elevated levels, you should consult a doctor for a proper evaluation.

The calprotectin levels in the stool closely correlates with the activity and extent of inflammatory mucosal changes. Very high calprotectin levels are found for example in active chronic inflammatory gastrointestinal diseases, inflammatory or extensive ulcerative colitis or carcinoma. People with chronic diffuse gastrointestinal diseases, food allergies or malabsorption instead show lower to moderately elevated levels (50-100 mg/l). Regardless of the cause of the elevated levels, one should strive to achieve healing of the intestinal mucosa. According to studies, this is achieved particularly well by the addition of phosphatidylcholine (lecithin), which also supports the formation of an effective mucosal barrier by stabilizing and strengthening the mucosa. Because intestinal microflora can partially convert phosphatidylcholine to TMA (trimethylamine), which is further metabolized in the liver to TMAO (trimethylamine N-oxide) and can promote vascular inflammation and other side effects, it is advisable to reduce the dose of lecithin and increase the desired effect by adding fiber, beta-glucan, butyrate and L-glutamine and/or capsaicin.

Alpha-1 antitrypsin

Name	Your value	Unit	Reference value	Scale
Alpha-1 antitrypsin	 23.04	mg/dl	< 27,5	



Alpha-1 antitrypsin regulates its inflammatory response by blocking enzymes released by leukocytes and macrophages.

Elevated levels of alpha-1 antitrypsin indicate an inflammatory irritation of the intestinal mucosa. This can lead to a decrease in the absorption of nutrients from food. There is often a link between elevated alpha-1 antitrypsin levels and an increased permeability of the intestinal mucosa, which in turn can lead to an increased load on the body's systemic defense system.

Regardless of the cause of the elevated levels, one should not try to achieve healing of the intestinal mucosa. According to studies, this is achieved particularly well by the addition of phosphatidylcholine (lecithin), which also supports the formation of an effective mucosal barrier by stabilizing and strengthening the mucosa. Because intestinal microflora can partially convert phosphatidylcholine (PC) to methylnine, which is further metabolized in the liver to TMAO (trimethylamine N-oxide) and can promote vascular inflammation and other problems, it is advisable to reduce the dose of lecithin and increase the desired effect by adding alpha-linolenic, butyric acid, L-glutamine and/or reseeded.

Mucosal immunity

Secretory IgA

Name	Your value	Unit	Reference value	Scale
Secretory IgA	 234.15	µg/ml	510 - 2040	

Secretory IgA neutralizes viruses and prevents pathogenic bacteria, viruses or fungi from attaching to the surface receptors in the intestinal mucosa. Secretory IgA thus belongs to our "first defense" against antigens and pathogens in the gastrointestinal tract and respiratory tract and protects against exposure to food-generated antigens.



Low levels of sIgA lead to an increased amount of antigens and that ongoing infections can no longer be managed, which leads to a chronic susceptibility to infections. This means that low levels are associated with disease states such as allergies, increased susceptibility to infection, immune-suppressive conditions or fungal infection in the gut. Low levels of sIgA may also occur in case of protein deficiency.

High levels may indicate an increased activity of defense reactions in the intestinal mucosa, which may be due to inflammatory or allergic processes.

In low levels, supplements of probiotics are recommended.

Leaky gut

Zonulin

Name	Your value	Unit	Reference value	Scale
Zonulin	 91.73	ng/ml	< 55	

Zonulin is a protein that modulates the permeability of the tight junctions in the intestinal mucosa. This is so that nutrients and other molecules can pass through. If you have a leaky gut, these tight junctions are more open than usual and large protein molecules that normally shouldn't be allowed through can pass.



Elevated levels are associated with increased intestinal permeability and others low levels indicate tight and stable intestinal mucosa. Increased intestinal permeability can cause in autoimmune diseases, inflammatory bowel disease and celiac disease. Increased levels of zonulin are often measured in patients with celiac disease, type 1 diabetes and many other autoimmune diseases.

In case of elevated zonulin levels, the following is recommended:

- A) Supplementing with broad spectrum probiotics that support the intestinal flora and directly affect the stabilization of tight junctions.
- B) Supplementing with lecithin phosphatidylcholine that support the intestinal mucosa.
- C) Supplementing with butyric acids that cross the mucosa and in that process reduces the permeability of the intestinal mucosa. In addition, butyric acids promote mucus production and neurogenesis.

Stress load and food intolerance

Histamine

Name	Your value	Unit	Reference value	Scale
Histamine	 5387.60	ng/ml	< 959	

Elevated levels of histamine in the stool indicate histamine intolerance or an IgE-mediated food allergy. It may be due to a disturbance in the production of the enzyme diamine oxidase (DAO), which function is to break down histamine in the gut. In addition, it can be due to celiac or Crohn's disease, food intolerance (IgE) or to stress, which via the in-vitro release of norepinephrine leads to the degranulation of mast cells and thereby increased histamine release in the gut.

How can you use the results

Our treatment protocol developed by the Institute for Functional Medicine in the United States to restore gastrointestinal health and other problems that originate therefrom. If you have any imbalances, we recommend that you follow the program as described below. The program usually takes between 3-6 months to complete.

1. Remove

Find and exclude any microbes, foods or toxins that may interfere with normal intestinal function and exclude them. Examples of common herbal herbs are Allergenic extract, berberine, caprylic acid, grape seed extract, olive leaf extract and oil of oregano. If you suspect food intolerances at a toxic level, we offer food intolerance tests and heavy metals tests.

2. Replace

Support the digestive system with suitable digestive support. For example, betaine HCl with pepsin, digestive enzymes or herbs such as cardamom, cinnamon, fennel, ginger, grape and turmeric.

3. Reinoculate

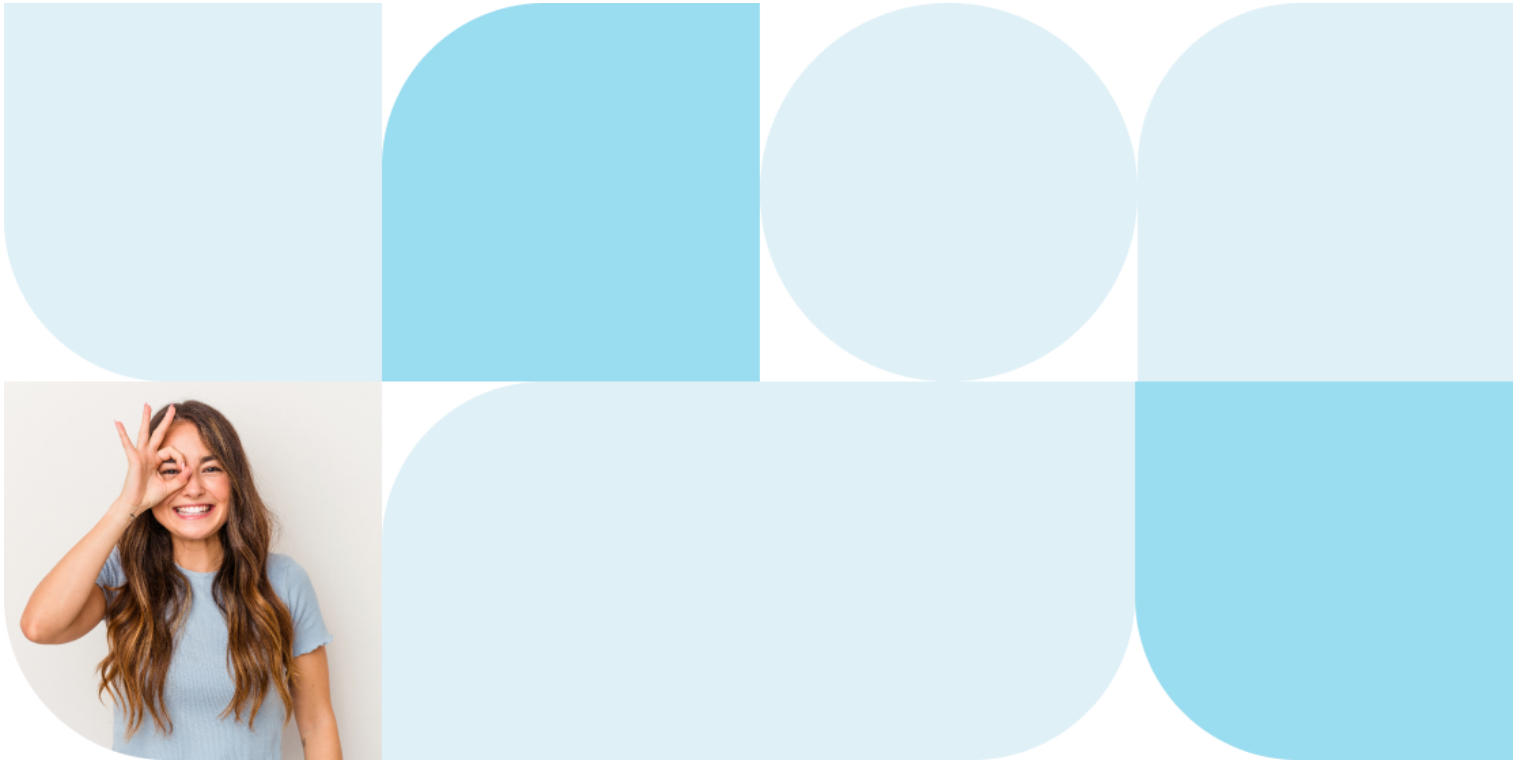
Reinoculate the intestinal flora with dietary (see probiotic foods) and probiotic supplements. Choose probiotics according to the intestinal bacteria you are low on according to the test results.

4. Repair

Support the intestinal mucosa. Examples of substances to support the intestinal mucosa are zinc, zinc, B-vitamins, essential fatty acids, L-glutamine, Marshmallow root and vitamin A.

5. Rebalance

Rebalance your lifestyle that includes diet, exercise, sleep and stress.



Other information

Leaky gut

The intestine is of great importance for the health of the body. In addition to absorbing nutrients, it has a very important function for our immune system - the intestinal mucosa acts as a protective barrier between the body and our environment.

In order to perform its tasks correctly, the intestine needs:

- A balanced bacterial population (our intestinal flora/microbiome)
- Adequate production of substances that support the intestinal mucosa
- Adequate levels of secretory IgA (sIgA)
- An undamaged intestinal epithelial cell layer

The intestine is important in giving endogenous infections. The commensal intestinal flora is a barrier that makes it difficult for unwanted bacteria from outside of the body to settle in the intestine. This is called colonization resistance.

The mucus produced by the intestinal mucosa is important for the transport of food in the intestine. It protects the mucosa, is important for its integrity and is therefore the basis for maintaining normal permeability. In addition, sIgA is transferred to and distributed in the intestine with the mucus. sIgA has the important job of binding antigens of all types in the intestinal lumen, for example bacteria, viruses, large macromolecules, etc. In this way it reduces the stress on the mucosa membrane while keeping the antigen inside the intestine, prevents it from coming into contact with the mucosa membrane and leads it out of the body.

sIgA thus controls the antigens in the body and the frequency of infection. It is therefore very important for the immune system.

The controlled (nutrient) substance passage from the intestinal lumen into the circulatory system takes place at the intestinal epithelial layer. First, this is done by the cells themselves (transcellular) and secondly between the cells (paracellular). The transcellular transport takes place without further disturbance of the cells via simple diffusion, via specialized receptors or by enclosing the substance by invaginating the cell membrane (endocytosis). The paracellular passage through the single epithelial layer, on the other hand, takes place at so-called "tight junctions". These are parts of a protein network, which encloses the cells and acts as gaps more or less. In some places, at these "tight junctions", the network allows a controlled passage of liquid and dissolved or colloidal substances.

If one or even several of the above conditions for a healthy gastrointestinal system are missing, various health problems will occur. If the intestinal flora is not in good condition, for example, pathogens can spread more easily and cause infections. If sIgA is not available in sufficient amounts, the antigen load on the immune system increases. If the epithelial layer and its tight junctions do not hold right, large amounts of unwanted substances can pass into the body. These substances can spread over time and cause problems in different parts of the body - especially autoimmune diseases.

Leaky gut and its significance

A well-functioning absorption capacity in the intestine is crucial for providing the body with nutrition. On the other hand, the intestinal mucosa protects the body from pathogens, bacteria, contaminants, etc. Therefore, a controlled permeability in the intestine is of great importance for our health.

If the intestinal permeability increases, large amounts of substances pass into the circulatory system. The increased amount of substances can have a negative effect on the body in the long run. The consequence of this is a reaction of the immune system against these substances - i.e. the intestinal mucosa is infected, which in the long run leads to damage to the intestinal mucosa, which further increases the intestinal permeability and a vicious cycle is entered.

In addition, there are other immunological reactions of the immune system – fights against harmful food components, which pass into the body due to the “leaky gut”. However, lead to food allergies or food intolerances and more problems will occur over time. People with a “leaky gut” can – in the long run – produce antibodies, which lead to the body's own organ surfaces and suddenly the body begins to – fight against itself! Simply explained, this means that a permeable intestine can cause autoimmune diseases and this has been proven in studies for – among other things – type 1 diabetes, multiple sclerosis and rheumatoid arthritis. One can only assume that a permeable intestine can be a (contributing) cause of many more diseases.

Underlying causes of increased intestinal permeability

First of all, various intestinal diseases affect the permeability of the intestine. Diseases such as Crohn's and ulcerative colitis always lead to increased intestinal permeability. Other diseases and various types of intolerances such as lactose, fructose, etc. also affect intestinal permeability. Excessive pancreatic mass –glycine (lack of enzymes to break down food) also damages the intestinal mucosa and increases its permeability. Furthermore, infections, imbalances in the intestinal – flora, toxins, as well as acute and chronic physical and mental stress can affect the permeability of the intestinal mucosa due to the increase in stress hormones.

Causes of increased intestinal permeability can be:

- In secondary bowel diseases
- Colon diseases
- Food intolerances
- Impaired pancreatic function
- Low secretory IgA
- Mental and physical stress
- Infections and incorrect intestinal colonization (bacteria, parasites, viruses and yeast)
- Alcohol
- Drugs
- Heavy metals
- Excessive stress

Milder intestinal inflammation

Mild intestinal inflammation can be a consequence of different diseases states and can occur in different parts of the intestine. Most often, the lower part of the small intestine or the upper part of the large intestine is affected, which leads to nutrient uptake. Undigested food has a tendency to remain in the intestine, which can cause irritation.

In case of irritation in the stomach/intestine, it is good to take into account and exclude foods that you are intolerant to. A well-balanced diet should be developed to reduce the strain on the gut. This can be accomplished by eating several smaller meals a day instead of large, heavy meals, as well as avoiding certain foods that can sometimes interfere with proper gastrointestinal function:

- Gas producing vegetables: Cabbage, beans, onions, peppers, mushrooms, legumes
- Hot spices: Chili, pepper, garlic powder
- Foods high in fat: Fried food, fatty fish, hard cheese, mayonnaise
- Foods high in sugar: Sweets, products containing natural and artificial sweeteners
- Beverage: Alcohol, coffee, carbonated beverages, and drinks that are too hot or cold

It can be hard – to find out for food intolerances and exclude foods that may further irritate. Different cooking methods can also facilitate or make the food on the intestine more digestible.

During weight-loss periods, a diet rich in fibre is recommended to reduce its consumption. If you change your diet, remember to do it gradually.

Foods that are usually well tolerated:

- Amaranth, buckwheat, brown rice, millet and quinoa
- Eggs, all lean meat and poultry
- Cooked vegetables
- Potatoes and other tubers
- Farinaceous
- Ripen fruits

Nutritional deficiencies

Intolerance in the intestine can lead to impaired nutrient uptake. If you have any digestive issues, it can be a good idea to test yourself for any deficiencies of vitamins B12, iron, magnesium and zinc.

MCT oil

MCT oil is composed of medium-chain triglycerides, which are used in the liver of fat absorption and can be used as a readily available energy source. They can be more easily absorbed and digested independently of bile acids and digestive enzymes. Adding these fats should be done gradually to allow the intestine to adapt.

Fiber-rich food

Dietary fibre is a substance that the body can only use to a certain extent. Normally, fibre is excreted undigested, but can also be processed by the intestinal flora and provide some vital metabolic products such as butyrate that are very valuable for the body.

- Fibre has a structure that requires them to be chewed more and longer. Chewing leads to the release of saliva, which is for countermeasures to stress and tooth decay. Chewing a lot also leads to a faster feeling of satiety.
- Dietary fibre swells and binds water. This prolongs the feeling of satiety. It also increases the weight of the stool and stretches the intestinal walls, which triggers the muscles in the intestine to work and stimulates intestinal emptying. Improved bowel movements make it easier for toxic substances to be excreted from the body and reduce the risk of diseases linked to excessive toxin exposure.
- Fibre also can just bind water in the intestine. Bile acids produced from cholesterol are also bound up and excreted in the stool. The body is thus forced to form new bile acids from cholesterol and the cholesterol level is lowered.
- Dietary fibre is important for people with diabetes, as it has a positive effect on blood sugar.
- Dietary fibre stimulates the growth of beneficial bacteria and strengthens our natural intestinal flora while reducing the growth of unfavourable bacteria and harmful metabolic substances.

The general dietary recommendation for fibre intake is 25-35 grams of fibre per day for adults. In the table below you can see how much fibre different foods contain.

Type of food	Foods	Fiber in g / 100 g
Legumes (uncooked)	Broad beans	16,4
	Brown beans	16,4
	Mung beans	16,0
	Soybeans	15,3
	White beans	15,8
Fruits	Pomegranate	10,0
	Passion fruit	15,9
	Raisins	9,7
	Dried apricots	12,0
	Dried figs	18,5
Vegetables	Avocado	4,8
	Brussels sprouts	4,5
	Artichoke	5,0
	Sun-dried tomatoes	12,7
	Wheat sprouts	14,0
Grains	Fiber oatmeal	15,0
	Oat bran	18,0
	Hard bread (whole grain)	24,0
	Wheat bran	37,5
	Wheat germ	30,5

Support your intestinal flora through the right diet and beverage

We have a large number of bacteria in our gut. They support our immune system and intestinal mucosa by producing important metabolic products and other nutrients. Which substances the bacteria produce depends on the substrate in the intestine, i.e. food components that can not be broken down by the body. Based on their metabolic products, they support either the acid or the basic bacteria groups in the intestine. If the relationship between these two groups is in balance, the intestinal environment is slightly acidic. Lactic acid cultures thrive best in acidic environments while putrefactive bacteria prefer an alkaline environment.

Undigested food residues after consuming high protein and fatty foods are used by the putrefactive bacteria in the intestine. The metabolic products produced by a dominant putrefactive intestine flora can stress the liver, cause bloating and gas and in part have carcinogenic effects in the long term. Fiber-rich diets, on the other hand, support an acidic intestine flora, which supports peristalsis and protects against pathogens as well as carcinogenesis.

A well-balanced diet can largely balance the relationship between acid bacteria and basic bacteria. The intake of fat and protein should therefore be kept at a balanced and moderate healthy level.

Some ways to reduce fat and protein intake

- Eat lots of fruits and vegetables
- Avoid excessive intake of high fat foods
- Eat lean, all red meat and poultry
- Replace white flour products with whole grains
- Prepare the food carefully by, for example, steaming or baking in the oven rather than broiling, grilling or frying
- Make sure the fats you eat are good fats

This report does not replace medical consultation. Always seek medical attention if you experience severe symptoms.

