Gut Microbiome Mega

Lab test | Stool

Name: **Dummy Persson** Date of test: **10/05/2022** Analysis-ID: **TV4J3K-A713BWG**

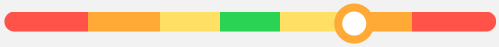
getTested

Your test results

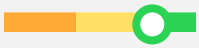
The gut flora or microbiome includes the bacteria and other microorganisms that are naturally found in the gut. Our intestinal flora has an influence on human health and disease. It modulates the immune system, supplies the body with vitamins, participates in the digestion of food components, provides intestinal epithelium with energy by producing short-chain fatty acids and stimulate intestinal peristalsis.

More important than individual bacterial species or genera is the interaction in the microbiome between different bacteria. Sufficient diversity is required to cope with various tasks in the intestinal flora. The diversity of species in the gut can vary considerably. While healthy people often have between 300-500 different types of bacteria in their microbiome, sick people often have significantly fewer. This can be due, for example, to several antibiotic courses, infections, old age, an unbalanced diet or smoking. Studies show that there are links between a reduced diversity and various diseases. Among other things, a reduced diversity has been seen in people with obesity, fatty liver, diabetes type 2, Alzheimer's disease, IBD/IBS and colon cancer. A reduced diversity provides a reduced protection against endogenous infections.

pH value

Name	Your value	Unit	Reference value	Scale
pH value	7.10	-	5,8 - 6,5	

Diversity

Name	Your value	Unit	Reference value	Scale
Diversity	6.44	-	> 5	

Enterotype

The human intestinal flora/microbiome can be divided into three enterotypes, which are defined by dominant bacterial clusters with distinct metabolic properties.

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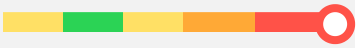
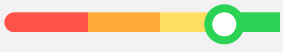
Dysbiosis

Name	Your value	Unit	Reference value	Scale
Dysbiosis	21.00	Index	0 - 10	

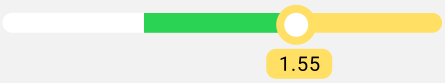
Phyla

Name	Your value	Unit	Reference value	Scale
Actinobacteria	0.26	%	1,0 - 5,0	
Bacteroidetes	36.53	%	30 - 60	
Firmicutes	56.45	%	30 - 60	
Fusobacteria	0.00	%	0,0 - 1,0	
Verrucomicrobiota	0.20	%	1,5 - 5,0	
Other	4.07	%	-	-

Metabolome

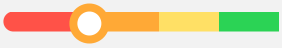
Name	Your value	Unit	Reference value	Scale
Secondary bile acids	0.48	%	< 1,0	
TMA / TMAO	0.28	%	< 0,5	
Indoxyl sulfate	0.00	%	< 0,005	
Phenols	0.07	%	< 1	
Ammonia	1.25	%	< 5	
Histamine-producing bacteria	0.00	%	< 0,05	
Equol	0.11	%	> 0,5	
Beta-glucuronidase	0.49	%	0,01 - 5	

Ratio

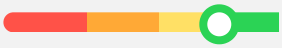
Name	Your value	Unit	Reference value	Scale
Firmicutes / Bacteroidetes	1.55	Quotient	< 1.5	
Actinobacteria / Proteobacteria	0.10	Quotient	> 0.5	
Prevotella / Bacteroides	0.49	Quotient	> 0.1	

Important bacterial genera and species

Actinobacteria

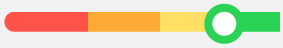
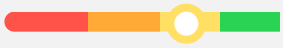
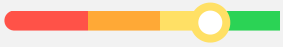
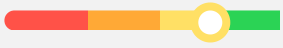
Name	Your value	Unit	Reference value	Scale
Bifidobacterium	6,9 x 10^7	KBE/g Stool	> 5,0 x 10^9	
Bifidobacterium longum	100.00	%		-

Bacteroidetes

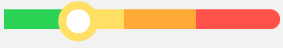
Name	Your value	Unit	Reference value	Scale
Bacteroides	1,6 x 10^11	KBE/g Stool	> 1,5 x 10^11	
Prevotella	7,9 x 10^10	KBE/g Stool	> 1,0 x 10^10	

Firmicutes

Butyrate-producing bacteria

Name	Your value	Unit	Reference value	Scale
Total amount of bacteria	2,2 x 10^11	KBE/g Stool	> 1,2 x 10^11	
Faecalibacterium prausnitzii	9,2 x 10^10	KBE/g Stool	> 5,0 x 10^10	
Eubacterium rectale	4,9 x 10^9	KBE/g Stool	> 1,0 x 10^10	
Eubacterium hallii	7,8 x 10^9	KBE/g Stool	> 5,0 x 10^9	
Roseburia spp.	1,7 x 10^10	KBE/g Stool	> 2,0 x 10^10	
Ruminococcus spp.	5,5 x 10^10	KBE/g Stool	> 3,0 x 10^10	
Coprococcus spp.	1,7 x 10^10	KBE/g Stool	> 2,0 x 10^10	
Butyrivibrio spp.	3,0 x 10^10	KBE/g Stool	> 5,0 x 10^9	

Clostridia

Name	Your value	Unit	Reference value	Scale
Total amount of Clostridia	5,4 x 10^9	KBE/g Stool	< 4,0 x 10^9	
Clostridia Cluster I	6,9 x 10^7	KBE/g Stool	< 2,0 x 10^9	

Fusobacteria

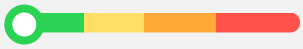
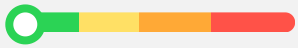
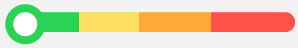
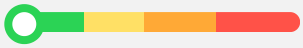
Name	Your value	Unit	Reference value	Scale
Fusobacterium	< 1,0 x 10^5	KBE/g Stool	< 1,0 x 10^7	

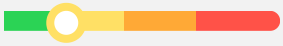
Verrucomicrobiota

Name	Your value	Unit	Reference value	Scale
Akkermansia muciniphila	1,7 x 10^8	KBE/g Stool	> 5,0 x 10^9	

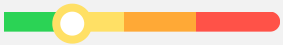
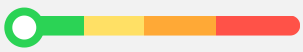
Proteobacteria

Potentially pathogenic bacteria

Name	Your value	Unit	Reference value	Scale
Haemophilus spp.	1,7 x 10^7	KBE/g Stool	< 1,0 x 10^9	
Acinetobacter spp.	< 1,0 x 10^5	KBE/g Stool	< 1,0 x 10^6	
Proteus spp.	< 1,0 x 10^5	KBE/g Stool	< 1,0 x 10^6	
Klebsiella spp.	< 1,0 x 10^5	KBE/g Stool	< 1,0 x 10^6	
Enterobacter spp.	1,7 x 10^7	KBE/g Stool	< 1,0 x 10^6	
Serratia spp.	< 1,0 x 10^5	KBE/g Stool	< 1,0 x 10^6	
Hafnia spp.	< 1,0 x 10^5	KBE/g Stool	< 1,0 x 10^6	
Morganella spp.	< 1,0 x 10^5	KBE/g Stool	< 1,0 x 10^6	
Citrobacter spp.	< 1,0 x 10^5	KBE/g Stool	< 5,0 x 10^8	

Name	Your value	Unit	Reference value	Scale
Pseudomonas spp.	5,2 x 10^7	KBE/g Stool	< 5,0 x 10^7	
Providencia spp.	< 1,0 x 10^5	KBE/g Stool	< 5,0 x 10^7	

H2S-production (hydrogen sulfide)

Name	Your value	Unit	Reference value	Scale
Sulfate-reducing bacteria	4,6 x 10^9	KBE/g Stool	< 2,0 x 10^9	
Desulfovibrio piger	< 1,0 x 10^5	KBE/g Stool	< 1,0 x 10^9	
Desulfomonas pigra	< 1,0 x 10^5	KBE/g Stool	< 1,0 x 10^9	
Bilophila wadsworthii	< 1,0 x 10^5	KBE/g Stool	< 2,0 x 10^9	

Immunogenicity / Mucin production

Immune-stimulating bacteria

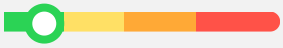
Name	Your value	Unit	Reference value	Scale
Escherichia coli	4,8 x 10^7	KBE/g Stool	10^6 - 10^7	
Enterococcus spp.	6,9 x 10^7	KBE/g Stool	10^6 - 10^7	
Lactobacillus spp.	< 1,0 x 10^5	KBE/g Stool	10^5 - 10^7	

Mucin production / Mucosal barrier function

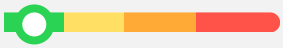
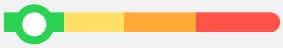
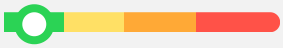
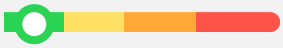
Name	Your value	Unit	Reference value	Scale
Akkermansia muciniphila	1,7 x 10^8	KBE/g Stool	> 5,0 x 10^9	
Faecalibacterium prausnitzii	9,2 x 10^10	KBE/g Stool	> 5,0 x 10^10	

Archaea

Methanogens

Name	Your value	Unit	Reference value	Scale
Methanobrevibacter spp.	6,9 x 10^7	KBE/g Stool	< 1,0 x 10^8	

Mycobiota

Name	Your value	Unit	Reference value	Scale
Candida albicans	<1,0 x 10^3	KBE/g Stool	<1,0 x 10^3	
Candida krusei	<1,0 x 10^3	KBE/g Stool	< 1,0 x 10^3	
Candida glabrata	<1,0 x 10^3	KBE/g Stool	< 1,0 x 10^3	
Candida dubliniensis	<1,0 x 10^3	KBE/g Stool	< 1,0 x 10^3	
Candida parapsilosis	<1,0 x 10^3	KBE/g Stool	< 1,0 x 10^3	
Candida tropicalis	<1,0 x 10^3	KBE/g Stool	< 1,0 x 10^3	
Candida lusitaniae	<1,0 x 10^3	KBE/g Stool	< 1,0 x 10^3	

Parasites

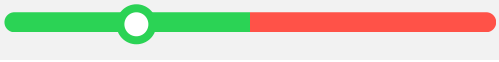
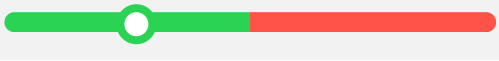
Pathobionts

Name	Your value	Reference value	Scale
Blastocystis hominis	Negative	Negative	
Dientamoeba fragilis	Negative	Negative	

Pathogenic intestinal protozoa

Name	Your value	Reference value	Scale
Giardia lamblia	Negative	Negative	
Entamoeba histolytica	Negative	negativ	
Cryptosporidium spp.	Negative	Negative	
Cyclospora cayetanensis	Negative	Negative	

Intestinal worms

Name	Your value	Reference value	Scale
Roundworm	Negative	Negative	
Hookworm	Negative	Negative	
Whipworm	Negative	Negative	
Strongyloides stercoralis	Negative	Negative	
Pinworm/Threadworm	Negative	Negative	
Echinococcus multilocularis	Negative	Negative	
Necator americanus	Negative	Negative	
Flatworm/Tapeworm	Negative	Negative	
Microsporidia	Negative	Negative	

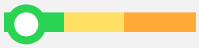
Digestive residues

Name	Your value	Unit	Reference value	Scale
Quantitative determination of fat	6.00	g/100g	< 3,5	
Quantitative determination of nitrogen/protein	0.80	g/100g	< 1,0	
Quantitative determination of sugar	3.00	g/100g	< 2,5	
Quantitative determination of water	74.60	g/100g	75 - 85	

Detection of indigestion

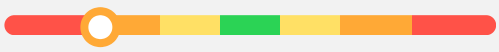
Name	Your value	Unit	Reference value	Scale
Pancreatic elastase	190.62	µg/g	> 200	

Inflammatory markers

Name	Your value	Unit	Reference value	Scale
Calprotectin	17.90	mg/l	< 50	
Alpha-1 antitrypsin	28.05	mg/dl	< 27,5	

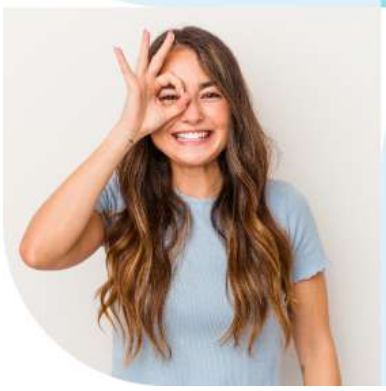
Mucosal immunity

Sekretoriskt IgA

Name	Your value	Unit	Reference value	Scale
Secretory IgA	201.73	µg/ml	510 - 2040	

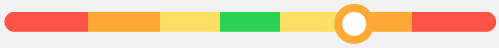
Helicobacter Pylori

Name	Your value	Reference value	Scale
Helicobacter Pylori	Positive	Negative	



Extended information

pH value

Name	Your value	Unit	Reference value	Scale
pH value	7.10	-	5,8 - 6,5	

The pH value in the feces can show if there are any excessive fermentation or putrefaction processes going on in the intestine. A pH value that is too low often occurs in connection with dysfunctional intestinal flora, when complex sugars are metabolized into fatty acids, which can contribute to an acidified stool. An excessively high pH value can be due to excessive amounts of protein, which can stimulate certain intestinal bacteria to produce ammonia and other metabolic waste products, which thereby raises the pH value of the feces.

An intestinal environment with an elevated pH can be stabilized by the addition of Lactobacillus bacteria and other butyrate producing bacteria in combination with a diet rich in fiber and low in fat and protein.

Diversity

Name	Your value	Unit	Reference value	Scale
Diversity	6.44	-	> 5	

Enterotype

The human gut microbiome can be divided into three enterotypes, which are defined by dominant bacterial clusters with particular metabolic properties.

1

According to current research, human microbiomes can be divided into three main groups, so-called enterotypes. Depending on the enterotype, gut bacteria then form stable, distinctly different clusters with typical metabolic properties. Enterotype 1 is characterized by high colonization by Bacteroides. Enterotype 2 is characterized by high colonization by Prevotella. Enterotype is rarely present – it is found in just under 5% of the analyzes carried out. These are characterized by a high colonization of Ruminococcus flora.

The described enterotypes differ markedly in their metabolic properties. Enterotype 1 is optimal for utilization of fat, fatty acids, proteins and amino acids. However, carbohydrates are metabolized much worse than by the enterotype 2-dominant type. Enterotype 2 is often found in people who eat large amounts of fruits and vegetables, especially common among vegetarians. The probability of enterotype 2 increases with the proportion of added fiber in the food.

Prevotella is optimally adapted to the utilization of carbohydrates. Unlike Bacteroides species, Prevotella can hardly synthesize vitamins. The enterotype thus also affects nutrient absorption. Absorption is significantly better in people with Prevotella-dominant enterotype 2, except for some B vitamins and zinc. The impaired ability to synthesize vitamins is thus partially offset by a better absorption.

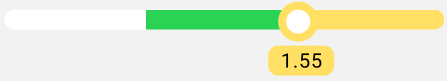
If you belong to enterotype 2, always pay attention to adequate supply of micronutrients. This applies above all to minerals and vitamins formed by Bacteroides:

- Biotin
- Riboflavin
- Pantothenic acid
- Vitamin C

Dysbiosis

Name	Your value	Unit	Reference value	Scale
Dysbiosis	21.00	Index	0 - 10	

Firmicutes/Bacteroidetes

Name	Your value	Unit	Reference value	Scale
Firmicutes / Bacteroidetes	1.55	Quotient	< 1.5	

People with IBS or obesity often have a high proportion of Firmicutes. Studies have investigated the role of the microbiome in developing obesity. What has been discovered is that Firmicutes can ferment complex, difficult-to-digest carbohydrates in such a way that short-chain fatty acids (SCFA) are formed, which are absorbed through the intestinal mucosa and which can be used as an additional source of energy. By fermenting indigestible carbohydrates, Firmicutes bacteria can make 10-12% more energy available.

Bacteroidetes cannot digest complex carbohydrates. If Firmicutes predominate over Bacteroidetes in the microbiome, this leads to an increased Firmicutes-Bacteroidetes ratio, which may favor weight gain. In people with irritable bowel syndrome (IBS), an increased ratio of Firmicutes to Bacteroides is often associated with flatulence/gas formation.

Actinobacteria/Proteobacteria

Name	Your value	Unit	Reference value	Scale
Actinobacteria / Proteobacteria	0.10	Quotient	> 0.5	0.10

Actinobacteria and Proteobacteria together make up about 5-10% of the total intestinal flora. The proportion of Proteobacteria in healthy adults should not exceed 5%. Many bacterial species from this phylum have facultative pathogenic properties and produce metabolites such as histamine, indoles, phenols, TMA and hydrogen sulfide that are directly or indirectly harmful to the intestinal mucosa or other organs.

Decreased amounts of Actinobacteria to Proteobacteria have been reported in many intestinal and extraintestinal diseases that have been shown to have mostly an inflammatory component. For example, an elevated ratio often occurs in people with severe symptoms of Crohn's disease.

A reduced ratio can occur as a result of antibiotic treatment, and can lead to symptoms such as severe flatulence/gas formation and constipation.

Prevotella/Bacteroides

Name	Your value	Unit	Reference value	Scale
Prevotella / Bacteroides	0.49	Quotient	> 0.1	

Prevotella and Bacteroides are the two most common genera of bacteria found in the gut. Their share in the microbiome is decisive for assignment to enterotypes 1 (Bacteroides) and 2 (Prevotella).

The ratio between Prevotella and Bacteroides, i.e. the Prevotella-Bacteroides ratio, increases in the presence of metabolic diseases and unwanted weight changes.

Phyla

The large intestine is colonized by bacteria that reach a total cell density of approximately 10^{11}-10^{12} bacterial cells/ml intestinal content. This dense community of bacteria mainly consists of three or four main bacterial phyla: Actinobacteria, Bacteroidetes, Firmicutes and Proteobacteria. Other phyla (Fusobacteria, Verrucomicrobiota) are very rare.

Name	Your value	Unit	Reference value	Scale
Actinobacteria	0.26	%	1,0 - 5,0	
Bacteroidetes	36.53	%	30 - 60	
Firmicutes	56.45	%	30 - 60	
Fusobacteria	0.00	%	0,0 - 1,0	
Verrucomicrobiota	0.20	%	1,5 - 5,0	
Other	4.07	%	-	-

Metabolome

Secondary bile acids

Name	Your value	Unit	Reference value	Scale
Secondary bile acids	0.48	%	< 1,0	

In the intestine, bile acids are broken down by bacteria, e.g. they can be deconjugated again and the resulting free bile acids converted to secondary bile acids by Clostridium or Eubacteria (e.g. deoxycholic acid DCA, lithocholic acid LCA). These can be toxic and cause DNA damage.

The chemical transformation of bile acids, which is done with the help of intestinal bacteria, has a great impact on the organism. Thus, bile acids affect the mucosal immune system via interactions with receptors such as farsenoid X receptor (FXR), Takeda G protein receptor 5 (TGR5) or Vitamin D receptor (VDR). They also regulate bile, glucose and lipid metabolism by activating bile acid receptors.

A reduction in bile acid-metabolizing bacteria has consequences not only for bile acid metabolism, but also for glucose and cholesterol balance, the immune system, and more.

TMA / TMAO

Name	Your value	Unit	Reference value	Scale
TMA / TMAO	0.28	%	< 0,5	

Trimethylamine (TMA) is a bacterial metabolite mainly produced by certain genera of bacteria from choline, but also from betaine or L-carnitine. TMA is the precursor to TMAO (trimethyl-N-oxide) which is formed in the liver.

TMAO has been shown to be a contributing factor in the pathogenesis of cardiovascular disease although the science is equivocal. It affects cholesterol and bile acid metabolism and promotes inflammation in the vessel walls.

Indoxyl sulfate

Name	Your value	Unit	Reference value	Scale
Indoxyl sulfate	0.00	%	< 0,005	

Indoxyl sulfate is a uremic toxin and an indolic substance that is a product of bacterial tryptophan metabolism.

In higher concentrations, indoxyl sulfate has prooxidative effects by activating NADPH oxidase and thus increases inflammatory processes in the vascular system.

In addition, indoxyl sulfate can have a negative impact on bone density, kidney function and increase the risk of anemia.

Phenols

Name	Your value	Unit	Reference value	Scale
Phenols	0.07	%	< 1	

Phenols or phenolic substances are uremic toxins and are metabolites of bacterial amino acid metabolism. In high concentrations, phenolic substances have negative effects on the body. The prooxidative effect of p-cresol sulfate can lead to endothelial dysfunction and cardiovascular diseases. In addition, it can inhibit the enzyme P450 and thus affect cellular detoxification.

Phenylacetylglutamine, a compound of phenylacetate and glutamine, can be found in the urine of individuals with high levels of nitrogen pollution and can lead to cardiovascular disease.

Ammonia

Name	Your value	Unit	Reference value	Scale
Ammonia	1.25	%	< 5	

Ammonia is formed by the breakdown of amino acids. The anaerobic flora is also an important ammonia producer. Above all, with incorrect colonization and an alkaline intestinal environment, ammonia is increasingly absorbed through the intestinal wall.
Ammonia is a cytotoxic agent and can negatively affect the functions of nerves and mitochondria.

Histamine-producing bacteria

Name	Your value	Unit	Reference value	Scale
Histamine-producing bacteria	0.00	%	< 0,05	

As a signaling molecule, histamine plays a central role in the immune system and in allergic reactions. It is a biogenic amine and is formed from the amino acid histidine. This transformation can also take place in the gut by certain bacteria.

Elevated values are mainly found in type I allergies or pseudoallergies. Causes of an increased histamine load can be food allergy, pseudoallergy or chronic stress, which can lead to degranulation of mast cells, which in turn, among other things, can lead to increased mucosal permeability ("leaky gut").

Equol

Name	Your value	Unit	Reference value	Scale
Equol	0.11	%	> 0,5	

Equol is a bacterial metabolite mainly synthesized when soy products are consumed.

It has a binding affinity to estrogen receptors and has shown positive benefits in menopausal symptoms and may protect against atherosclerosis, osteoporosis or neuroinflammatory diseases.

Mainly species such as Adlercreutzia, Eggerthella and Slackia can form equol. However, bacterial formation varies greatly between individuals. While in Europe only about 20-30% of the population can produce equol, in Asia it is 50-60%.

Beta-glucuronidase

Name	Your value	Unit	Reference value	Scale
Beta-glucuronidase	0.49	%	0,01 - 5	

β-Glucuronidase is an enzyme that is formed as part of human metabolism, but also by various bacterial genera. The microbial β-glucuronidase activity in the intestine ensures that hormones, active substances or toxins that have been inactivated as a conjugate are released again.

Depending on the intensity of the activity, this has a physiologically important effect, but it can also cause a wide range of diseases.

Important bacterial genera and species

Actinobacteria

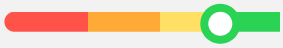
Name	Your value	Unit	Reference value	Scale
Bifidobacterium	6,9 x 10^7	KBE/g Stool	> 5,0 x 10^9	
Bifidobacterium longum	100.00	%		-

Bifidobacteria represent the most important genus within Actinobacteria. They are gram-positive, anaerobic rod-shaped bacteria that mainly use starch but also oligosaccharides. This results in acetic acid and lactic acid, among other things.

Lower levels of bifidobacteria often occur after repeated antibiotic treatment, in chronic inflammatory bowel disease or colorectal carcinoma.

Through the formation of short-chain fatty acids (SCFAs) and a lowering of the pH value in the intestinal lumen, bifidobacteria not only counteract the spread of pathogens (colonization resistance), but they also have an anti-inflammatory effect. Lower levels thus favor endogenous infections.

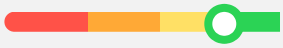
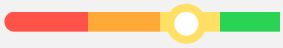
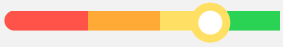
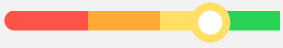
Bacteroidetes

Name	Your value	Unit	Reference value	Scale
Bacteroides	1,6 x 10^11	KBE/g Stool	> 1,5 x 10^11	
Prevotella	7,9 x 10^10	KBE/g Stool	> 1,0 x 10^10	

Bacteroides and Prevotella are particularly common genera in the microbiome of many people and regularly account for > 40% of the total gut flora. They define Enterotypes 1 and 2 as distinct biomarkers of nutrition.

Firmicutes

Butyrate-producing bacteria

Name	Your value	Unit	Reference value	Scale
Total amount of bacteria	2,2 x 10^11	KBE/g Stool	> 1,2 x 10^11	
Faecalibacterium prausnitzii	9,2 x 10^10	KBE/g Stool	> 5,0 x 10^10	
Eubacterium rectale	4,9 x 10^9	KBE/g Stool	> 1,0 x 10^10	
Eubacterium hallii	7,8 x 10^9	KBE/g Stool	> 5,0 x 10^9	
Roseburia spp.	1,7 x 10^10	KBE/g Stool	> 2,0 x 10^10	
Ruminococcus spp.	5,5 x 10^10	KBE/g Stool	> 3,0 x 10^10	
Coprococcus spp.	1,7 x 10^10	KBE/g Stool	> 2,0 x 10^10	
Butyrivibrio spp.	3,0 x 10^10	KBE/g Stool	> 5,0 x 10^9	

The fermentation of carbohydrates in the colon leads to the formation of short-chain fatty acids (SCFAs) and gases (H2, CO2, methane). The SCFAs that can be detected in stool samples mainly include formic acid, acetic acid, propionic acid and butyric acid.

Dietary changes lead to changes in the production rate of short-chain fatty acids. Low-carbohydrate diet reduces butyrate formation by up to a quarter, while prebiotics and increased fiber intake lead to an increase in SCFAs.

SCFAs have many positive health effects. They have a stimulating effect on intestinal motility and reduce inflammatory reactions. Butyrate/butyric acid is the most important energy source for colonocytes, it has an anti-inflammatory effect and protects against cell degeneration and has a preventive effect against colorectal carcinoma/colon cancer.

The formation of butyrate in the gut is mainly due to Firmicutes. Common genera such as Eubacterium, Roseburia, Ruminococcus, Coprococcus, but also Butyrivibrio spp. and Clostridium butyricum are involved. However, the strongest butyrate producer is Faecalibacterium prausnitzii, which, unlike the other butyrate producers mentioned, is able to utilize considerably less starch. Since butyrate is rapidly absorbed through the intestinal mucosa, quantitative studies of the butyrate-forming bacteria make it possible to draw valuable conclusions about the butyrate production of the intestinal flora.

Clostridia

Name	Your value	Unit	Reference value	Scale
Total amount of Clostridia	5,4 x 10^9	KBE/g Stool	< 4,0 x 10^9	
Clostridia Cluster I	6,9 x 10^7	KBE/g Stool	< 2,0 x 10^9	

Clostridia belong to Firmicutes. They are anaerobic bacteria and form spores. The Clostridia genus includes pathogens, but also apathogenic, beneficial bacteria that have an immunomodulatory effect and lead to an increase in IL-10. The pathogenic representatives mainly include Clostridium botulinum, Clostridium tetani or Clostridium difficile. In terms of their preferred energy sources, Clostridia can be divided into two groups, proteolytic and saccharolytic types..

Proteolytic Clostridia use protein and amino acids. Saccharolytic species, on the other hand, ferment carbohydrates, starch or fiber to produce butyrate, acetone, butanol, CO2 and hydrogen. A predominance of proteolytic types often indicates a so-called "putrefactive dyspepsia", which is usually accompanied by an increased stool pH. If the pH value - despite high counts of proteolytic species - is normal or reduced, this is usually due to an accelerated intestinal passage. High Clostridia counts can also be associated with "fermentation dyspepsia". Then it is about saccharolytic species.

Some Clostridia groups, so-called Cluster I Clostridia, contain toxin-forming species, e.g. C. perfringens, C. sporogenes or C. histolyticum. Cluster I Clostridia occur more often in autistic-type diseases and can be the cause of autism-related intestinal problems as well as extraintestinal problems.

Fusobacteria

Fusobacteria occur in humans as part of the physiological microbiome in the oral cavity and are also regularly detected in smaller proportions in the intestinal microbiome. They are obligate anaerobic, spindle-shaped, rod-shaped bacteria. Especially Fusobacterium nucleatum and Fusobacterium necrophorum have pathological potential in infection science and are associated with dental caries and periodontitis in the oral cavity.

Already in 2012, metagenomic analyzes showed an accumulation of Fusobacterium nucleatum in colorectal carcinomas (CRC)/colon cancer. It is not yet clear whether fusobacteria can actually trigger a tumor or use the decaying tumor tissue as a source of nutrients.

Name	Your value	Unit	Reference value	Scale
Fusobacterium	< 1,0 x 10^5	KBE/g Stool	< 1,0 x 10^7	

Verrucomicrobiota

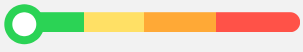
Name	Your value	Unit	Reference value	Scale
Akkermansia muciniphila	1,7 x 10^8	KBE/g Stool	> 5,0 x 10^9	

Akkermansia muciniphila is a gram-negative bacterium essential for gut health. It breaks down mucin, stimulating mucus production to protect the intestinal barrier and reduce inflammation. Low levels are linked to reduced mucus, increasing susceptibility to pathogens. Studies suggest that prebiotics like inulin, polyphenols, and Akkermansia-based probiotics can effectively boost its levels.

Proteobacteria

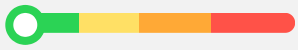
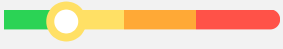
Potentially pathogenic bacteria

Haemophilus spp.

Name	Your value	Unit	Reference value	Scale
Haemophilus spp.	1,7 x 10^7	KBE/g Stool	< 1,0 x 10^9	

The genus Haemophilus are facultatively anaerobic, gram-negative bacteria that live on human mucous membranes and can cause disease.

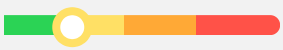
Haemophilus influenzae lives mainly on the mucous membranes of the upper respiratory tract (nose, throat, trachea) and causes inflammatory diseases there (epiglottitis, bronchitis, pneumonia, meningitis). Encapsulated, H. influenzae is a pathogen. Unencapsulated strains are only pathogenic under certain circumstances. H. emophilus parainfluenzae mainly occurs as a pathogen in endocarditis.

Name	Your value	Unit	Reference value	Scale
Acinetobacter spp.	< 1,0 x 10^5	KBE/g Stool	< 1,0 x 10^6	
Proteus spp.	< 1,0 x 10^5	KBE/g Stool	< 1,0 x 10^6	
Klebsiella spp.	< 1,0 x 10^5	KBE/g Stool	< 1,0 x 10^6	
Enterobacter spp.	1,7 x 10^7	KBE/g Stool	< 1,0 x 10^6	
Serratia spp.	< 1,0 x 10^5	KBE/g Stool	< 1,0 x 10^6	
Hafnia spp.	< 1,0 x 10^5	KBE/g Stool	< 1,0 x 10^6	
Morganella spp.	< 1,0 x 10^5	KBE/g Stool	< 1,0 x 10^6	
Citrobacter spp.	< 1,0 x 10^5	KBE/g Stool	< 5,0 x 10^8	
Pseudomonas spp.	5,2 x 10^7	KBE/g Stool	< 5,0 x 10^7	
Providencia spp.	< 1,0 x 10^5	KBE/g Stool	< 5,0 x 10^7	

Microbiome analyzes show that there is often an increase in Enterobacteriaceae (Escherichia coli, Klebsiella, Enterobacter, Proteus) or Pasteurel laceae (e.g., Haemophilus) with increasing age due to impaired digestive function.

The described changes can also be caused by other factors. Repeated intake of antibiotics also leads to an increase in the number of Enterobacteriaceae, Enterococci and Clostridia, as well as a significant decrease in Bifidobacteria. The same can be observed in chronic inflammatory bowel diseases or irritable bowel.

H2S-production (hydrogen sulfide)

Name	Your value	Unit	Reference value	Scale
Sulfate-reducing bacteria	4,6 x 10^9	KBE/g Stool	< 2,0 x 10^9	
Desulfovibrio piger	< 1,0 x 10^5	KBE/g Stool	< 1,0 x 10^9	

Name	Your value	Unit	Reference value	Scale
Desulfomonas pigra	< 1,0 x 10^5	KBE/g Stool	< 1,0 x 10^9	
Bilophila wadsworthii	< 1,0 x 10^5	KBE/g Stool	< 2,0 x 10^9	

Hydrogen sulfide is a toxic residual product which, in higher concentrations, leads to damage to the intestinal epithelium and thus promotes the appearance of cellular typia. H2S is formed in the colon by sulfate-reducing bacteria, mainly Bilophila wadsworthii, Desulfomonas pigra and Desulfovibrio piger. Meat is an important source of sulfur, which promotes the growth of sulfate-reducing bacteria.

Immunogenicity / Mucin production

Immune-stimulating bacteria

Escherchia coli

Name	Your value	Unit	Reference value	Scale
Escherichia coli	4,8 x 10^7	KBE/g Stool	10^6 - 10^7	

Escheria coli belongs to the putrefaction bacteria. Putrefactive bacteria are bacteria that thrive best in an alkaline environment and produce ammonia. If the pH value is too high, they grow and can outcompete good bacteria.

Decay bacteria primarily metabolize protein and fat. Toxic alkalizing metabolites such as ammonia, indole, skatole or hydrogen sulfide are evolved, which damage the intestinal mucosa and may lead to an increase in colonic pH (>6.5) in the long term.

Elevated levels are often caused by insufficient activity of the mucosal immune system. If the intestinal flora is characterized by an increased amount of putrefaction bacteria, one can try to reduce the pH value in the intestinal lumen by giving pre- or probiotics. This promotes the reconstitution of the acidifying intestinal flora and inhibits the growth of putrefactive bacteria. Less toxic metabolic products (ammonia, hydrogen sulfide) are produced, which relieves the burden on the liver and kidneys.

Enterococcus spp.

Name	Your value	Unit	Reference value	Scale
Enterococcus spp.	6,9 x 10^7	KBE/g Stool	10^6 - 10^7	

Enterococcus, which belongs to the physiological small intestinal flora, develops acidic metabolic waste products and antibacterial substances that prevent foreign bacterial colonization in the small intestine (resistance to small intestinal colonization – SIBO).

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

Lactobacillus spp.

Name	Your value	Unit	Reference value	Scale
Lactobacillus spp.	< 1,0 x 10^5	KBE/g Stool	10^5 - 10^7	

Lactobacillus is a bacterium that occurs in the small intestine and forms antibacterial substances and metabolic waste products that prevent foreign bacteria from colonizing the small intestine (SIBO).

Too low levels can occur in cases of, among other things, neurodermatitis, food allergies or food intolerances. Too high levels can occur in case of weakened digestive capacity.

Mucin production / Mucosal barrier function

Akkermansia muciniphila

Name	Your value	Unit	Reference value	Scale
Akkermansia muciniphila	1,7 x 10^8	KBE/g Stool	> 5,0 x 10^9	

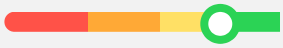
Akkermansia muciniphila is a strictly anaerobically growing, gram-negative bacterium that breaks down mucin (mucosal mucus) but at the same time stimulates the mucosa to produce more mucus and antimicrobially active molecules. High levels of Akkermansia indicate a thick mucin layer. Low levels often occur together with a reduced mucus production which allows pathogens, pollutants and allergens to penetrate the mucous membrane and can thus cause inflammation.

By breaking down mucus, Akkermansia muciniphila provides essential nutrients for Faecalibacterium prausnitzii – the main producer of butyrate/butyric acid. Butyric acid plays a key role as an energy supplier for intestinal epithelial cells and protects the intestinal mucosa. Studies have shown that prebiotics (specifically inulin) and polyphenols increase levels of Akkermansia muciniphila.

Features of Akkermansia:

- stabilization of the mucosal barrier
- antidiabetic effect by supporting hormone production (GLP-1/2)

Faecalibacterium prausnitzii

Name	Your value	Unit	Reference value	Scale
Faecalibacterium prausnitzii	9,2 x 10^10	KBE/g Stool	> 5,0 x 10^10	

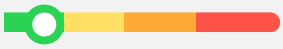
Inflammatory insults in the intestinal mucosa are often characterized by an increase in acute phase proteins in the stool (alpha-1-antitrypsin, calprotectin or lysozyme). Another indicator of inflammatory mucosal irritation can be the absence of the intestinal bacterium Faecalibacterium prausnitzii. Faecalibacterium prausnitzii appears to occur only in humans and is found in the mucosa.

Faecalibacterium prausnitzii produces butyrate/butyric acid and secretes substances that have an anti-inflammatory effect by blocking NF-kB activation and IL-8 production.

Butyric acid can protect against, among other things, bowel cancer. Low amounts of Faecalibacterium prausnitzii occur in Crohn's disease, in bowel cancer and in diseases that accompany inflammatory mucosal changes, for example diseases in the autistic spectrum, obesity or IBS.

Archaea

Methanogens

Name	Your value	Unit	Reference value	Scale
Methanobrevibacter spp.	6,9 x 10^7	KBE/g Stool	< 1,0 x 10^8	

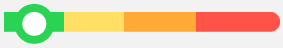
Methanogens such as Methanobrevibacter spp. belong to the archaea domain and are not bacteria. In humans, stable colonization occurs in the gastrointestinal tract and oral cavity, in the vagina and on the skin. There, methanogens form a syntropic community with other microorganisms. The most common representative in the gastrointestinal tract with >90% is Methanobrevibacter smithii.

Methanogens can reduce CO2 during H2 consumption, as well as secondary bacterial metabolites such as acetate to methane. The abundance of methanogens is related to various diseases. Increased methane formation can reduce intestinal motility and promote constipation-type irritable bowel syndrome. Increased methane production has also been described in people with diverticulosis. However, through the consumption of H2/hydrogen gas, methanogens also favor the growth of fiber-fermenting bacteria and thus the production of SCFAs.

Increased levels of Methanobrevibacter spp. can thus promote constipation and be causally relevant in case of miscolonization of the small intestine with increased methane formation (methane gas-SIBO).

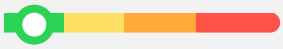
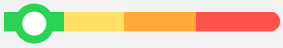
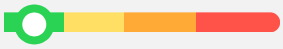
Mycobiota

Candida albicans (CA)

Name	Your value	Unit	Reference value	Scale
Candida albicans (CA)	<1,0 x 10^3	KBE/g Stool	<1,0 x 10^3	

Candida albicans belongs to the group of facultative pathogenic yeasts which - under certain circumstances - reproduce intensively and can cause mucosal mycosis. Candida albicans accounts for 80-90% of all Candida mycoses.

Items that come into contact with human mucous membranes are often contaminated by yeast. To avoid the recurrence of infections, toothbrushes, artificial prostheses or braces should be disinfected regularly.

Name	Your value	Unit	Reference value	Scale
Candida krusei (CK)	<1,0 x 10^3	KBE/g Stool	< 1,0 x 10^3	
Candida glabrata (CG)	<1,0 x 10^3	KBE/g Stool	< 1,0 x 10^3	
Candida dubliniensis (CD)	<1,0 x 10^3	KBE/g Stool	< 1,0 x 10^3	
Candida parapsilosis (CP)	<1,0 x 10^3	KBE/g Stool	< 1,0 x 10^3	
Candida tropicalis (CTp)	<1,0 x 10^3	KBE/g Stool	< 1,0 x 10^3	
Candida lusitaniae (CL)	<1,0 x 10^3	KBE/g Stool	< 1,0 x 10^3	

Parasites

Pathobionts

Blastocystis hominis

Name	Your value	Reference value	Scale
Blastocystis hominis	Negative	Negative	

Blastocystis hominis can often be carried without experiencing any symptoms. The symptoms often occur when we are exposed to additional strain on the body such as stress, another illness or the like.

Common symptoms are diarrhea or constipation, flatulence, abdominal pain and weight loss. Some studies show that there are links between Blastocystis and Hashimoto's (autoimmune thyroid disease).

In vitro and in vivo studies have shown an inhibitory effect of various herbal extracts such as oregano, garlic (allicin), ginger oil and black cumin extract. Probiotics with Saccharomyces boulardii have also shown a good effect that is comparable to antibiotics.

Both antibiotic treatment and treatment with herbal extracts should always be supported by a simultaneous administration of probiotics in order to strengthen the patient's intestinal flora. Keep in mind that oregano oil has a blood thinning effect so people taking blood thinners should refrain from taking oregano oil. Preparations based on Saccharomyces boulardii are contraindicated in seriously ill or immunosuppressed patients.

Dientamoeba fragilis

Name	Your value	Reference value	Scale
Dientamoeba fragilis	Negative	Negative	

Dientamoeba fragilis is a commonly occurring parasite and even this can be carried without experiencing symptoms. Common symptoms are diarrhea and pain and discomfort in the stomach. Some studies suggest that there are links between IBS and Dientamoeba fragilis. It is a facultative pathogenic parasite with widespread geographic distribution that often occurs asymptomatically. Treatment should only be carried out if the symptoms are clearly classified.

Treatment: Studies have shown that black cumin extract is effective in treating Dientamoeba fragilis. Supplementation with Saccharomyces boulardii can also be recommended. Antibiotic treatment is only indicated for persistent clinical symptoms, as it often shows high recurrence rates, leads to resistance and also negatively affects the intestinal flora. Both antibiotic treatment and treatment with herbal extracts should always be supported by a simultaneous administration of probiotics in order to strengthen the patient's intestinal flora.

Pathogenic intestinal protozoa

Giardia lamblia

Name	Your value	Reference value	Scale
Giardia lamblia	Negative	Negative	

Giardia lamblia can survive in water (even mildly chlorinated water) for several months, and it is therefore more common for more people to become infected during the summer months when you spend more time outdoors and can then accidentally ingest contaminated water or food. Common symptoms are abdominal bloating, nausea, discomfort and fatigue.

Entamoeba histolytica

Name	Your value	Reference value	Scale
Entamoeba histolytica	Negative	Negative	

Entamoeba histolytica is relatively common, but only causes problems in around 10-20% of those infected and thus it can be difficult to detect.

It is an infectious disease of the intestine and causes symptoms such as diarrhea and vomiting. The parasite is spread via contaminated water and food, so good hand hygiene is key to keeping these parasites away. Most common in poorer parts of the world.

Cryptosporidium species

Name	Your value	Reference value	Scale
Cryptosporidium spp.	Negative	Negative	

Cryptosporidium is present all over the world and people are usually infected by drinking water or eating food contaminated with the parasite. Both humans and animals can become infected via their feces. The parasite can also be transmitted between people and from animals to humans. Symptoms are often severe and watery diarrhea and stomach pains.

Diagnosis of Cryptosporidium is usually via stool samples with PCR analysis or specific staining.

Cyclospora cayetanensis

Name	Your value	Reference value	Scale
Cyclospora cayetanensis	Negative	Negative	

Cyclospora cayetanensis is most commonly found in tropical countries and is usually transmitted via fresh and untreated plant products. It is common for the symptoms to come and go and the most common are watery diarrhoea, nausea, stomach pain and weight loss.

Intestinal worms

Name	Your value	Reference value	Scale
Roundworm	Negative	Negative	
Hookworm	Negative	Negative	
Whipworm	Negative	Negative	
Strongyloides stercoralis	Negative	Negative	
Pinworm/Threadworm	Negative	Negative	
Echinococcus multilocularis	Negative	Negative	
Necator americanus	Negative	Negative	
Flatworm/Tapeworm	Negative	Negative	
Microsporidia	Negative	Negative	

Roundworm, or nematode, is a small, coiled worm that is usually microscopic in size. Roundworms are a very individual-rich group and one of the most common in the animal kingdom, with more than 20,000 species described, of which only a few are active as parasites in humans.

Hookworm is a type of nematode characterized by the fact that it resembles a small hook. They are parasites that feed by sucking blood in the host's small intestine. Hookworms are common in the tropics and are there a very common cause of anemia (lack of blood), mainly in children.

Whipworm is a type of roundworm that can live as a parasite in humans. It rarely occurs in Sweden, but mainly affects people in countries with poor water hygiene. It is often transmitted by ingestion of unclean water, soil or food that has been washed in water containing worm eggs. The worm eggs then develop in the small intestine into 30-40 millimeter long worms that look like a whip, hence the name whipworm. It feeds by sucking blood in the host's small intestine.

Strongyloides stercoralis is a 2 millimeter long parasitic nematode, also called roundworm. It is a parasite that occurs mainly in tropical and subtropical climates. It can multiply and live both as a parasite in humans and as free-living in moist soil. In humans, it mainly lives in the bloodstream, lungs or intestinal tract.

Pinworm/Threadworm is a common intestinal parasite that is most common in children but also affects adults. It is usually noticed by itching in the rectal opening, especially in the evening and/or at night.

Echinococcus multilocularis is a smaller form of tapeworm of which there are different types with partially different host animals and disease patterns in humans. Echinococcus multilocularis which is the most common type occurs in many countries in the northern hemisphere. Cases among humans are rare but serious because the disease is difficult to treat.

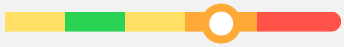
Necator americanus is a type of hookworm and nematode similar to the common hookworm. It is a parasite that lives in the small intestine of the host and is one of the most common types of hookworm that infects humans. The American hookworm occurs in both temperate and tropical climates.

Flatworm/Tapeworm are parasites that occupy the digestive tract of vertebrates. They are long and flat, of which the smallest species are only a few millimeters long, while the largest can be more than 10 meters long.

Microsporidia are a type of parasite that occurs throughout the world. There is a very large number of species described and all kinds of animals including mammals, fish, birds and insects can be hosts but only a few species can cause the disease microsporidiosis which is very rare in developed countries.

Digestive residues

Quantitative determination of fat

Name	Your value	Unit	Reference value	Scale
Quantitative determination of fat	6.00	g/100g	< 3,5	

Elevated levels of fat in the stool may be due to diet (high fat diet) or indicate disturbances in fat breakdown or the absorption. It may be due to a disturbance in bile secretion, bile acid resorption or incomplete secretion of fat-splitting enzymes in the pancreas.

Quantitative determination of nitrogen/protein

Name	Your value	Unit	Reference value	Scale
Quantitative determination of nitrogen/protein	0.80	g/100g	< 1,0	

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

Quantitative determination of sugar

Name	Your value	Unit	Reference value	Scale
Quantitative determination of sugar	3.00	g/100g	< 2,5	

Elevated levels are often due to carbohydrate intolerance. Common causes are usually lactose intolerance (15-22%) and fructose malabsorption (30-40%). A deficient carbohydrate metabolism can also be due to an excretory risk pancreatic insufficiency with reduced secretion of carbohydrate-digesting enzymes. At elevated levels, a possible carbohydrate intolerance is ruled out. This can first be checked via provocation with 0.5 l of whole milk (indication on lactose intolerance) and 10-15 prunes (indication of fructose malabsorption).

Quantitative determination of water

Name	Your value	Unit	Reference value	Scale
Quantitative determination of water	74.60	g/100g	75 - 85	

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

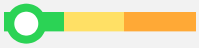
Pancreatic elastase

Name	Your value	Unit	Reference value	Scale
Pancreatic elastase	190.62	µg/g	> 200	

A protease enzyme secreted by the pancreas that breaks down elastin, the specific protein in elastic fibers and digests other proteins such as fibrin, hemoglobin and albumin. Too low levels occur in weakened pancreatic function, gallstones, cystic fibrosis, and can occur in vegans or vegetarians.

Inflammatory markers

Calprotectin

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

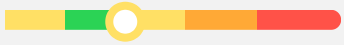
Calprotectin is a marker of inflammation in the gastrointestinal tract. Elevated levels can be due to intestinal infections, dysbiosis, food allergens, toxins, certain drugs, inflammatory bowel disease, polyps, diverticulitis or colorectal cancer. In case of prolonged elevated levels, you should contact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

The calprotectin value in the stool correlates closely with activity and extent of inflammatory or invasive mucosal changes. Very high calprotectin values are found, for example, in active chronic inflammation gastrointestinal diseases, invasive enteritis or extensive ulcerative colorectal carcinoma. People with chronic gastro-intestinal diseases, food allergies or malabsorption instead show less to moderately elevated levels (50-150 mg/l).

Regardless of the cause of the elevated levels, one should first try to achieve healing of the mucosa with the help of anti-inflammatory measures. According to studies, this is achieved particularly well through the addition of lecithin, which also supports the formation of an effective mucosal barrier by stabilizing and strengthening the intestinal mucosa. Since the gut microbiota can partially convert phosphatidylcholine to trimethylamine (TMA), which is further metabolized in the liver to trimethylamine-N-oxide (TMAO) and can contribute to vascular inflammation and atherosclerosis, it is advisable to reduce the dose of lecithin and increase the desired effect by adding L-glutamine, gelatin/collagen and butyric acid.

While L-glutamine, as a nutrient for the intestinal epithelial cells, counteracts “leaky gut”, collagen and butyric acid mainly have mucosal protective and anti-inflammatory effects.

Alpha-1 antitrypsin

Name	Your value	Unit	Reference value	Scale
Alpha-1 antitrypsin	28.05	mg/dl	< 27,5	

Alpha-1-antitrypsin has the task of regulating inflammatory reactions by blocking enzymes released by leukocytes and macrophages.

Elevated levels of alpha-1 antitrypsin indicate an inflammatory irritation of the intestinal mucosa. It can lead to a decreased absorption of micronutrients and metabolic food products. Often there is a connection between elevated alpha-1 antitrypsin values and an increased permeability of the intestinal mucosa, which in turn can lead to an increased strain on the body's defense system.

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While L-glutamine, as a nutrient for the intestinal epithelial cells, counteracts “leakage intestine", collagen and butyric acid mainly have mucosal protective and anti-inflammatory effects.

Helicobacter Pylori

Name	Your value	Reference value	Scale
Helicobacter Pylori	Positive	Negative	

Helicobacter pylori infections of the gastric mucosa are one of the most common infectious diseases in the world and can cause peptic ulcers. With the help of immunoassays, specific antigens of Helicobacter pylori can be detected in feces.

The detection of Helicobacter antigens in feces does not provide information about pathogenicity or apathogenicity tribes. This can be distinguished using the Western-Blot analysis.

While in the case of apathogenic strains, a symptomatic treatment is sufficient; antibiosis (therapy combinations: Omeprazole / Amoxicillin or Omeprazole / Clarithromycin / Metronidazole) is recommended in pathogenic strains, especially if there are typical symptoms such as stomach pain, upset stomach or heartburn. In addition to the classic antibiotic, anti-homotoxic therapies have also proven to be successful. Anti-homotoxic treatments should be applied for at least 4 weeks. Also vitamin C (2 x 500 mg / day) and alkaline bismuth is one naturopathic alternative to antibiotics.

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