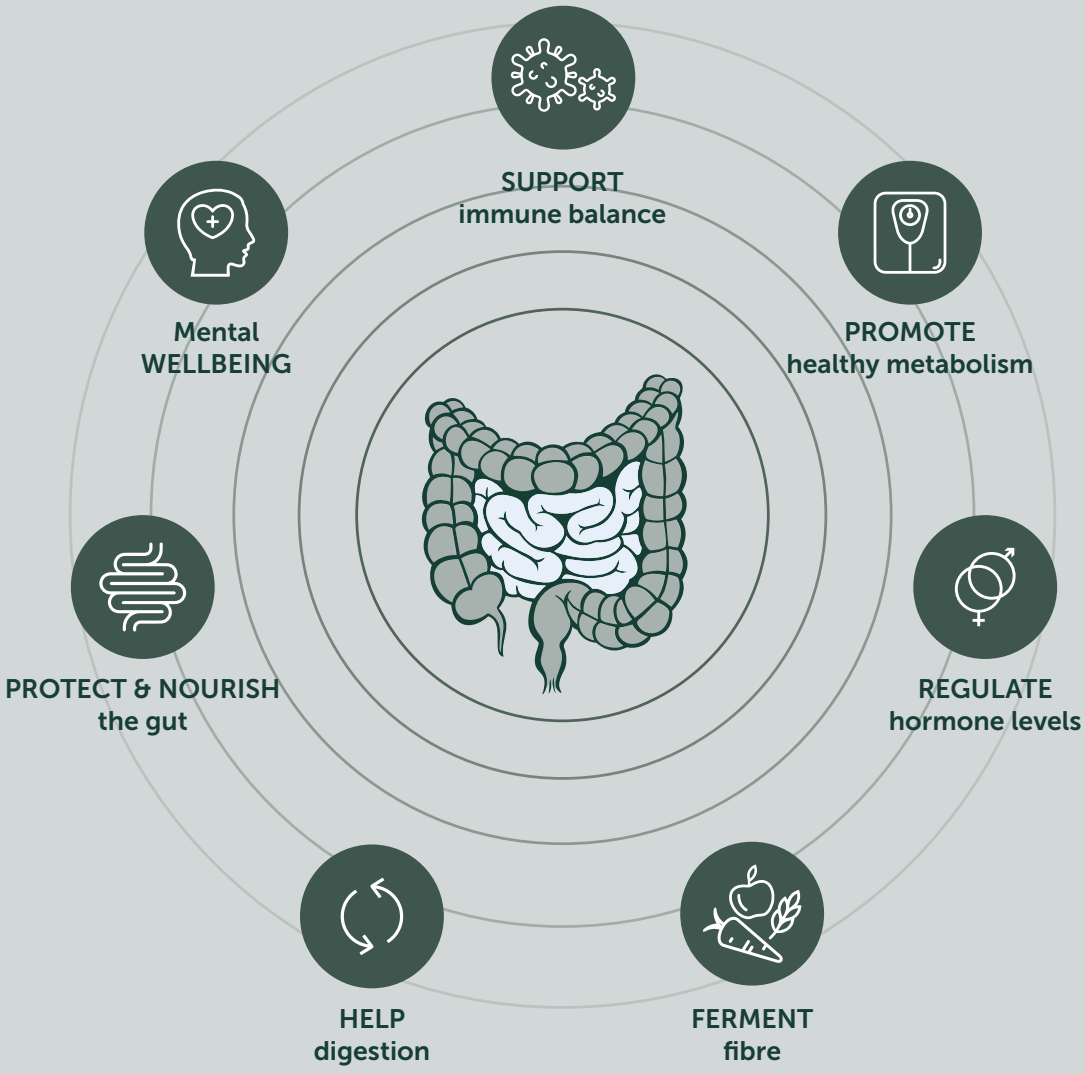
MetaXplore™
Powered by MiCROBA

Patient Interpretation Guide

Learn how to interpret your MetaXplore test to support your gut microbiome and gastrointestinal health.

What is the gut microbiome?

The gut microbiome is an intricate community consisting of trillions of microbes, or "gut bugs", residing in your digestive tract. This bustling ecosystem plays a pivotal role in digesting food, synthesising essential nutrients and regulating the immune system. The diversity and composition of your microbial community is like a fingerprint, specific to you and reflecting your lifestyle, diet and environment.



Your MetaXplore™ report is unique to you, providing you with a highly in-depth assessment of your gut microbiome. Measuring the microbes in your gut can indicate how your unique microbiome may be impacting your health and wellbeing now and in the future.

Your healthcare professional can guide you through your results within the context of your full health history and support you to make changes to improve your microbiome and your health. This could include modifications to your diet or lifestyle or through the prescription of personalised supplements.

Report Summary

Key features of your MetaXplore™ report
You will receive a comprehensive report of your MetaXplore™ test results. An extensive range of microbiome and gastrointestinal health markers are tested. Your healthcare professional will be able to highlight the key areas of importance to you depending on your test results and clinical situation.

Pathogen Panel*

What is a pathogen?
A pathogen is an organism that can cause illness or disease. If a particular pathogen is detected in your report, your healthcare professional will be able to determine next steps based on the specific pathogen detected and your clinical presentation.

Gastrointestinal Health Markers**

The gastrointestinal health markers include six diagnostic markers and one investigative marker, together providing an accurate measurement of your gut function and environment. On your report, the gastrointestinal health markers will appear as calprotectin, faecal pH, lactoferrin, occult blood, pancreatic elastase, secretory IgA and zonulin.

You can learn more about the individual gastrointestinal health markers here.

Microbiome Health

In assessing your MetaXplore™ report, there are microbial markers that show if your microbiome is out of balance, otherwise known as 'dysbiosis'.

Dysbiosis is where there is an imbalanced community of microbes in the gut that have been linked to health and disease.

If dysbiosis is present, it is typically represented by a reduced diversity of species within the gut, increased numbers of "bad" gut bacteria, or reduced numbers of "good" bacteria. Dysbiosis may also be present when there are out-of-range microbial markers.

While there are no official criteria for measuring dysbiosis, microbial diversity and microbial richness are measured in MetaXplore™ reports to provide an insight into your gut microbiome balance.

You can learn more about the individual microbial markers here.

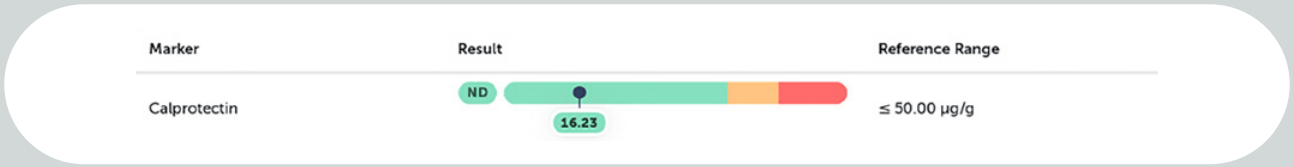
*Available in MetaXplore GI Plus only
**Available in MetaXplore GI and GI Plus only

Results

The results of your MetaXplore™ report are presented in several ways based on the type of marker.

Gastrointestinal health markers** are compared to research driven reference ranges. Normal results are shown in green while the orange and red results require review by a healthcare professional.

For example – calprotectin is a diagnostic gastrointestinal marker that is compared with specific reference range to determine if the result is normal (green), borderline high (orange) or high (red).



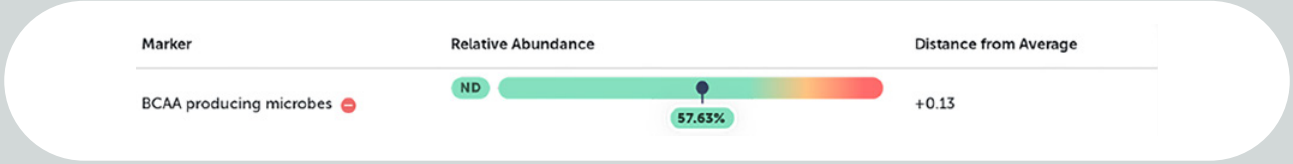
Microbial markers are measured using a relative abundance and this result is compared to the Microba healthy cohort using the distance from average.

Relative abundance is the percentage of all the microbes within the gut microbiome with the genetic ability to produce or consume the listed compound.

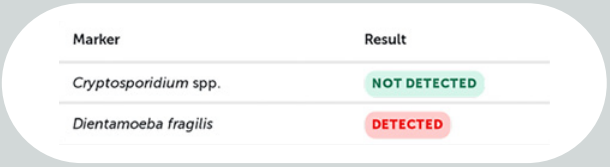
The distance from average provides information on whether the microbial marker accounts for a higher or lower proportion of the microbiome than is seen in the healthy cohort. A score equal to or near 0 means the abundance of that microbial marker is similar to the average in the healthy cohort. A negative value means the abundance is lower than the average in the healthy cohort, while a positive value means the abundance is higher than the average in the healthy cohort.

What is the Microba healthy cohort?
The Microba healthy cohort includes 484 exceptionally healthy Australians to put your results in context. To fulfil the criteria for the healthy cohort, the person must be mentally well, have no major medical conditions, not be pregnant and not be taking or have taken medications that influence the microbiome.

A green, orange and red coloured reference bar helps interpret the result. Green indicates a beneficial level and red indicates an undesirable level.



The targeted Pathogen Panel* will list pathogens as either detected or not detected.



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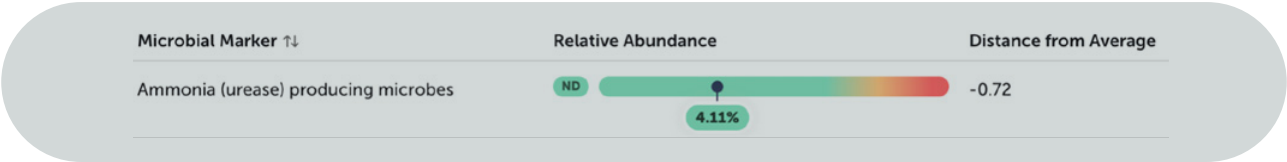
Other Testing

Emerging Metabolites

The Emerging Metabolites are markers which have historically been of clinical interest. The scientific evidence around these markers is still emerging leading to uncertainty around their role in health.

The Emerging Metabolites are measured according to the relative abundance and the distance from average.

A green, orange and red coloured reference bar helps you interpret your result compared to the healthy cohort. Green indicates a beneficial level and red indicates an undesirable level.

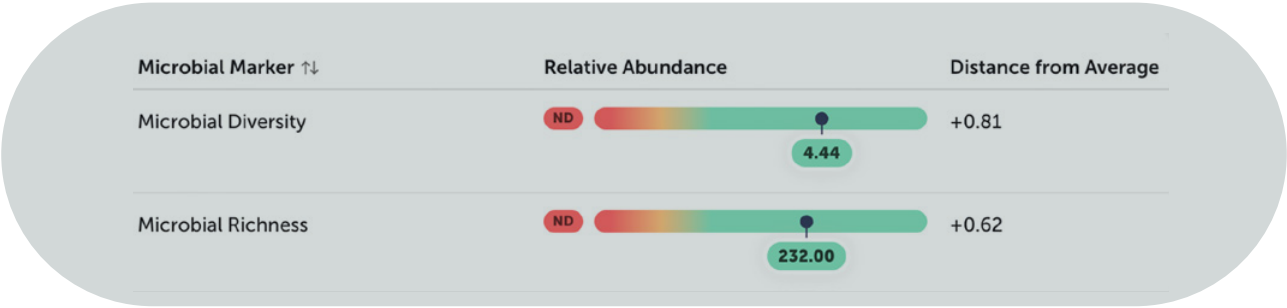


Diversity

Diversity is a measure of two things – the number of bacteria detected and how evenly spread they are.

Microbial richness measures the number of species, while the Shannon Diversity Index considers both richness and evenness. Considering these indexes together reveals whether a microbiome has a low number of species (low richness) or whether any species dominate the microbiome (low evenness).

Microbial diversity and richness are measured in the same way as the other microbial markers, according to the relative abundance and the distance from average.



Species Explorer

The Species Explorer provides information on all species detected in your sample. Each person's microbiome is made up of different combinations of microbial species.

The species table provides information on:

- the species name
- how prevalent (i.e. common) that species is in the healthy cohort
- the relative abundance of that species in your microbiome
- the distance from average, which compares the relative abundance of that species to the healthy cohort

Species Descriptions

More Info

The species descriptions provide your health professional with information to understand the role that species may have in your microbiome. Species which have been associated with health outcomes in the scientific literature contain a summary of this research in their description. This information can be used to assess the role of each microbe, including newly discovered species within your microbiome. This information can be used to guide your understanding on the microbe's contribution to overall microbiome function, as well as provide insight into the fuel sources it uses to thrive.

Understanding Prevalence

Prevalence provides information on whether an identified species is rare, less common, common or very common in the healthy cohort. There are no species that your microbiome must contain, however, more common species have been better researched, and are therefore better understood by the scientific community.

Understanding Relative Abundance

Relative abundance is considered as the 'evenness' of certain species within the gut, based on a percentage, in other words, whether it "dominates" your microbiome. It is a measure of how common the species is in your microbiome, relative to the total number of microbes in the sample.

Interpreting the Distance from Average

A score equal to or near 0 means the abundance of that species is similar to the healthy cohort.

	Firmicutes A	Blautia_A wexlerae	1.40%	Very Common	-0.39
⊕	Firmicutes A	Coprococcus_B comes	0.30%	Very Common	-0.08
⊖	Bacteroidota	Parabacteroides distasonis	0.31%	Very Common	0.43

A negative score means that species is under-abundant compared to the healthy cohort. The lower the number the more reduced the relative abundance of that species compared to the healthy cohort.

⊕	Firmicutes A	Faecalibacterium prausnitzii_K	0.09%	Common	-1.81
⊕	Actinobacteriota	Bifidobacterium animalis	0.01%	Less Common	-1.79

A positive score means that species is over-abundant compared to the healthy cohort. The higher the number the more increased the relative abundance of that species compared to the healthy cohort.

	Proteobacteria	Haemophilus_D parainfluenza...	0.16%	Less Common	2.69
⊖	Proteobacteria	Escherichia coli	1.90%	Less Common	2.56

Symbols

Symbols are provided to highlight species which have been associated with health or disease in the scientific literature. In most cases, it shows that a species is increased or decreased in a particular disease which does not mean it caused the disease, however, a correlation between the species abundance and the disease state has been observed. The same symbols have been applied to microbial markers.

Symbol	Description
	The plus symbol indicates health-associated species that have been shown to be reduced in the microbiomes of people with a certain disease compared to healthy controls.
	The minus symbol indicates disease-associated species that have been shown to be increased in the microbiomes of people with a certain disease compared to healthy controls.
	The plus/minus symbol indicates species that have been shown to be increased in the microbiomes of people with some diseases while reduced in the microbiomes of people with other diseases compared to healthy controls.

Gastrointestinal Health Markers**

Calprotectin	Calprotectin is used to measure inflammation in the gut. Your healthcare professional may refer you for further investigation if you have high calprotectin.
Faecal occult blood	Faecal occult blood detects small amounts of blood in your stool, which may not be seen with an unaided eye. Your healthcare professional may refer you for further investigation if faecal occult blood is detected in your sample.
Faecal pH	Faecal pH is a measure of the acidity (or alkalinity) of your stool. Faecal pH can be used by your healthcare professional as an indicator of gut transit time - the speed at which food travels from the mouth through to the anus. Low or high faecal pH may be addressed by your healthcare professional.
Lactoferrin	Lactoferrin is used to measure inflammation in the gut. Your healthcare professional may refer you for further investigation if you have high lactoferrin.
Pancreatic elastase	Pancreatic elastase is an enzyme produced by the pancreas that helps digest food. Your healthcare professional may refer you for further testing if you have a low level of pancreatic elastase.
Secretory IgA	Secretory IgA is part of the immune system and plays an important role in preventing infections. Either low or high levels of secretory IgA will help inform your healthcare professional's assessment of your gut health.
Zonulin	Zonulin is used to measure intestinal permeability, more commonly known as "leaky gut". High levels of zonulin may indicate increased permeability in your small intestine and may be addressed by your healthcare professional.

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Microbial Markers

Acetate producing microbes	Acetate is a short chain fatty acid (SCFA) produced when bacteria break down prebiotic fibres. Acetate plays a beneficial role in reducing inflammation in the gut and by feeding some butyrate producing species. Low amounts of acetate producing microbes may be addressed by your healthcare professional.
BCAA producing microbes	The branched chain amino acids (BCAA) are essential nutrients that are mainly obtained from food but can also be produced by microbes. High levels of BCAA producing microbes can contribute to high levels of BCAA's in the blood, which may predispose to inflammation throughout the body.
***B. fragilis* toxin producing microbes**	Some species of *Bacteroides fragilis* have the capacity to produce a toxin. This toxin may increase the permeability of the gut, more commonly known as "leaky gut". High amounts of *B. fragilis* toxin producing microbes may be actioned by your healthcare professional.
Beta-glucuronidase producing microbes	Beta-glucuronidase is a bacterial enzyme that can reactivate a wide variety of medications and hormones. High levels of beta-glucuronidase producing microbes may affect drug response and toxicity.
Butyrate producing microbes	Butyrate is a short chain fatty acid (SCFA) produced when bacteria break down prebiotic fibres. It is the main fuel source for gut cells and helps to strengthen the gut barrier. Butyrate can also reduce inflammation in the gut and throughout the body.
Hexa-LPS producing microbes	Hexa-acylated lipopolysaccharides (hexa-LPS) are components of the cell wall of many bacteria, but when these bacteria die, hexa-LPS is released into the gut where it can promote inflammation. High levels of hexa-LPS producing microbes have been associated with an increase in inflammation in both the gut and throughout the body.
Hydrogen sulphide producing microbes	The gas hydrogen sulphide is produced by gut microbes when they break down sulphur-containing compounds. This gas is responsible for the "rotten egg" smell of flatulence. High levels of hydrogen sulphide may increase the permeability of the gut, more commonly known as "leaky gut". However, low levels may be beneficial for integrity of the gut barrier. Your health professional may take action if you have a high level of hydrogen sulphide producing microbes.
IPA producing microbes	3-indolepropionic acid (IPA) is a beneficial substance produced by some species of bacteria. This strong antioxidant may help to reduce inflammation and strengthen the gut barrier. Low levels of IPA producing microbes may pre-dispose to a weak gut barrier and inflammation.
Methane producing microbes	Methane is an odourless gas produced by certain microbes in the gut called methanogens. A slower gut transit time and/or constipation may be associated with higher levels of methane.
Microbial diversity	Microbial diversity refers to the number of microbes detected in a sample and how evenly spread they are. Low diversity may be addressed by your healthcare professional, as it suggests either a low number of microbial species and/ or that some species dominate the microbiome.
Microbial richness	Microbial richness measures the number of different microbial species in your stool sample. A low microbial richness may be addressed by your healthcare professional.
Mucin consuming microbes	Mucin is a part of the mucus layer that lines and protects the gut wall. Increased levels of mucin consuming microbes may predispose to inflammation in the gut.

Oxalate consuming microbes	Some bacterial species can consume oxalate. Low levels of oxalate consuming microbes may result in increased oxalate excretion in the urine, especially if you are not consuming enough calcium. For some people this may increase their risk of kidney stones. Oxalate is a natural compound found in many healthy foods so should not be limited in the diet, unless advised by a healthcare professional.
Propionate producing microbes	Propionate is a short chain fatty acid (SCFA) produced when bacteria break down prebiotic fibres in the gut. Optimal propionate production can help keep your gut functioning well and may support immune balance within the gastrointestinal tract. Excessively high or low propionate producing microbes may be addressed by your healthcare professional.
Trimethylamine producing microbes	Trimethylamine (TMA) is produced by gut microbes from the breakdown of choline and carnitine found in food and supplements. It is transported to the liver where it is converted to the compound trimethylamine-n-oxide (TMAO). High levels of TMAO have been associated with inflammation, therefore a high level of TMA producing microbes may be addressed by your healthcare professional.

Health Categories

Intestinal motility	Intestinal motility is defined as the movement of contents through the gut. The microbial markers can be used to assess the relationship between the microbiome and the time it takes food to move through your gut (gut transit time). The gastrointestinal health marker (faecal pH) can help to evaluate gut transit time.
Intestinal inflammation	Intestinal inflammation refers to immune system activity in the gut. The microbial markers reveal whether the microbiome is likely to reduce or increase inflammation in the gut. Gastrointestinal health markers measure how much inflammation is currently happening in the gut.
Intestinal barrier	The intestinal barrier keeps the contents of your gut separate from the rest of your body. The microbial markers help determine if the gut microbiome is likely to support or compromise this barrier. Gastrointestinal health markers check how well the gut barrier is working in the small intestine.
Systemic inflammation	Systemic (or whole-body) inflammation can be identified by elevated markers of immune activity within the blood. The microbial markers assess if the gut microbiome has the potential to contribute or limit inflammation throughout the body.
Detox/retox	Detox represents the role of the microbiome in detoxification and removal of compounds from the body. The microbial markers assess the potential influence of the microbiome on oxalate, drug and hormone excretion.
Digestive secretions	Digestive secretions are fluids that help break down food and shape the environment in the gut. The gastrointestinal health marker (pancreatic elastase) is used to screen for pancreatic insufficiency.

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The MetaXplore™ range is only available for purchase through a healthcare professional. *The faecal occult blood, real-time polymerase chain reaction (RT-PCR) and enzyme-linked immunosorbent assays (ELISA) used in the MetaXplore™ range are diagnostic and are approved for clinical use. The faeces pH assay used in the MetaXplore™ range is for research use only and not to be used as a basis for diagnosis. The metagenomic assays used in the MetaXplore™ range are to determine the microbiome populations and associated functional pathways in a faecal sample. The application is for research use only and is not to be used as a basis for diagnosis. Learn more about the journey we are on to validate this gold-standard technology for clinical diagnosis and application at co-biome.com. The MetaXplore™ testing range has been developed for adults 18 years or older and the microbiome results will be compared to a cohort of healthy adults. The clinical and research insights within the report are based on the assessment of the scientific literature in adults over 18 years of age.

MetaXplore is proudly & exclusively available in Australia via Co-Biome and in the UK via Invivo Healthcare.

VER 3.0 | JAN 2025