

What Can Clinicians and Patients Expect from Healthpath Gut Health Testing?

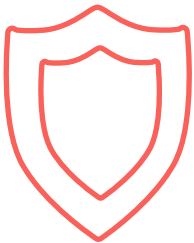
The Healthpath Gut Test shows you what's going on in your gut. By looking at imbalances in bacteria, yeasts, parasites and other intestinal health biomarkers, you find out what's contributing to your symptoms. You also receive targeted diet, supplement and lifestyle recommendations to help you take back control.

The biomarkers provide clinical information on three key areas:



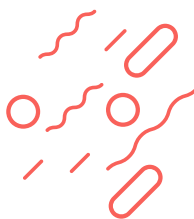
1 | Digestion/Absorption

- pH
- Pancreatic elastase
- Zonulin



2 | Immune activity/Inflammation

- Calprotectin
- Haemoglobin
- Secretory IgA
- H. Pylori
- Archaea/methanogens
- E. Coli, Lactobacillus species, Enterococcus species
- Akkermansia muciniphila, Faecalibacterium prausnitzii



3 | Gut Microbiome/Mycobiome

- Microbiome diversity
- Enterotype
- Dysbiosis index
- Actinobacteria
- Bacteroidetes
- Firmicutes
- Proteobacteria
- Fusobacteria
- Verrucomicrobia
- Hydrogen-sulphide production
- Oxalate-degrading bacteria
- Yeasts/moulds
- Parasites
- Helminths



Clinical Advantages of The Healthpath Gut Health Test qPCR Technology

This new method of analysis allows for a single sample. This makes the process easier for everyone, and it's particularly helpful for children and those struggling with diarrhoea or constipation.

	Gut Health Test	Advanced Gut Health Test Pro
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Stool properties

Colour	✓	✓
Consistency	✓	✓
pH	✓	✓

Diversity:

Your diversity is key, which is why our microbiome analysis covers hundreds of parameters. High bacterial diversity is known to protect against intestinal infections. But low bacterial diversity is common, especially in disease states or after a course of antibiotics. When diversity is low, opportunistic bacteria like pathogens, fungi and viruses can proliferate.

Rather than focusing on individual species, it's more important to investigate how the different bacteria interact. Together, they're responsible for a host of intestinal functions.

Biodiversity

Diversity	✓	✓
Dysbiosis index	✓	✓

There are four large phyla (groups) of bacteria: Bacteroidetes, Firmicutes, Actinobacteria and Proteobacteria. We also report on two smaller, clinically relevant phyla: Verrucomicrobia and Fusobacteria.

Bacterial distribution

Actinobacteria	✓	✓
Bacteroidetes	✓	✓
Firmicutes	✓	✓
Fusobacteria	✓	✓
Proteobacteria	✓	✓
Verrucomicrobia	✓	✓
Other	✓	✓
Firmicutes/ Bacteroidetes Ratio	✓	✓

Enterotype:

Recent research suggests there are three different types of gut microbiomes, known as 'enterotypes'. Not only do the different enterotypes influence the absorption of minerals, but they also have different metabolic properties.

Enterotype 1 has high levels of Bacteroides species, which use fat and protein effectively. Enterotype 2 has a strong Prevotella population, which is better at metabolising carbohydrates. Enterotype 3 is the rarest enterotype. It has high levels of Ruminococcus flora, though we don't yet know which macronutrients it prefers.

Enterotypes aren't affected by a person's age or gender and they remain stable for years. They can be influenced, however, by a long-term change of diet and by taking prebiotics.

Enterotype

1, 2 or 3	✓	✓
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Actinobacteria

Bifidobacteria	✓	✓
Equol-producing bacteria	✓	✓
Adlercreutzia species		✓
Eggerthella lenta		✓
Slackia species		✓

Bacteroidetes

Bacteroides	✓	✓
Prevotella	✓	✓
Prevotella copri	✓	✓

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Firmicutes:

Butyrate is a short-chain fatty acid that's produced by bacteria in the colon. It's quickly absorbed by the intestinal mucosa, which means the only reliable way to measure it is to look at the number of butyrate-producing bacteria.

Firmicutes bacteria are key butyrate producers. One of these, *Faecalibacterium prausnitzii*, typically makes up 5–15% of human intestinal bacteria. This important butyrate-producing species has anti-inflammatory properties—so much so that an absence of *Faecalibacterium prausnitzii* typically correlates with higher levels of inflammation.

Firmicutes

Butyrate-producing bacteria	✓	✓
Faecalibacterium prausnitzii	✓	✓
Eubacterium rectale	✓	✓
Eubacterium hallii	✓	✓
Roseburia species	✓	✓
Ruminococcus species	✓	✓
Coprococcus	✓	✓
Butyrivibrio species		✓
Cl. butyricum		✓
Total bacterial count	✓	✓
Clostridia	✓	✓
Clostridia total bacterial count	✓	✓
Clostridia cluster 1	✓	✓
Clostridia histolytium		✓
Clostridium perfringens		✓
Clostridium sporenges		✓
Other		✓
Christensenellaceae		✓
Dialister invisus		✓

Fusobacteria

Fusobacterium species	✓	✓
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Verrucomicrobia

Akkermansia muciniphila	✓	✓
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Proteobacteria

Potentially pathogenic bacteria	✓	✓
Haemophilus	✓	✓
Acinetobacter	✓	✓
Escherichia coli biovars	✓	✓
Proteus species	✓	✓
Proteus mirabilis		✓
Klebsiella species	✓	✓
Klebsiella pneumoniae		✓
Enterobacter species	✓	✓
Serratia species	✓	✓
Hafnia species	✓	✓
Morganella species	✓	✓
Campylobacter species		✓
Providencia species		✓
Citrobacter species		✓
Histamine-producing bacteria	✓	✓
H2S production	✓	✓
Hydrogen-sulphide production: Bacterial metabolism isn't always a good thing. Some bacteria reduce sulphate to create hydrogen sulphide—a toxic metabolic by-product that can damage the gut lining. The species <i>Bilophila wadsworthii</i> , <i>Desulfomonas pigra</i> and <i>Desulfovibrio piger</i> are thought to be potent hydrogen-sulphide developers.		
Sulphate-reducing bacteria	✓	✓
Desulfovibrio piger		✓
Desulfomonas pigra		✓
Bilophila wadsworthii		✓
Oxalate-degrading bacteria		✓
Oxalobacter formigenes		✓

Archaea:

Archaea have been overlooked in microbiome studies until recently. New research suggests that 1) archaea are part of the microbiome in plants, animals and humans, 2) they form biofilms and 3) they interact with the human immune system. Some archaea are also methanogens, which may play a role in chronic constipation.

Archaea

Methanobrevibacter	✓	✓
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Immunogenically effective bacteria

Escherichia coli	✓	✓
Enterococcus species	✓	✓
Lactobacillus species	✓	✓

Mucin production/mucosal barrier:

A healthy colon has a protective mucous layer. If this layer is damaged—or only small amounts of mucous are produced—pathogens, pollutants and allergens can come into direct contact with the mucosa. This leads to inflammation.

The bacterium Akkermansia muciniphila is important because it encourages goblet cells to produce this protective mucous. Parts of this mucous also provide a special type of carbohydrate called oligosaccharides, which feed the bacteria that make gut-healing butyrate. With the right bacteria, it becomes a virtuous circle!

Mucin production/mucosal barrier

Akkermansia muciniphila	✓	✓
Faecalibacterium prausnitzii	✓	✓

Yeasts/moulds

Candida albicans	✓	✓
Candida species	✓	✓
Geotrichum candidum	✓	✓
Moulds	✓	✓

Functional markers

Calprotectin	✓	✓
Haemoglobin in faeces immunologically	✓	✓
Secretory IgA	✓	✓
Pancreatic elastase	✓	✓
Zonulin		✓

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Parasites:

The Multiplex Real-time PCR (Multiplex quantitative real-time PCR) is a faster and more effective method for detecting parasites. This new test:

- provides reliable analysis, even with minimal attack
- gives no false positives with non-pathogens
- can be sent out with regular mail
- gives reliable results in symptom-free patients and also after treatment

Parasites

Pathobionts	✓	✓
Blastocystis hominis	✓	✓
Dientamoeba fragilis	✓	✓
Helicobacter AG	✓	✓
Pathogenic intestinal protozoa	✓	✓
Giardia lamblia	✓	✓
Entamoeba histolytica	✓	✓
Cryptosporidium species	✓	✓
Cyclospora cayetanensis	✓	✓
Helminths COMING SOON		✓
Taenia species		✓
Taenia solium		✓
Taenia saginata		✓
Ascaris species		✓
Enterobius vermicularis		✓
Ancylostoma species		✓
Ancylostoma duodenale		✓
Hymenolepis species		✓
Hymenolepis nana		✓
Hymenolepis diminuta		✓
Trichuris trichiura		✓
Necator americanus		✓
Strongyloides species		✓
Strongyloides stercoralis		✓
Microsporidia		✓
Enterocytozoon species		✓
Encephalitozoon species		✓