



Gx *gut health* Personal Report

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Welcome to Your GxGutHealth Personal Report

GxGutHealth Personal Report

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Congratulations!

You are about to receive innovative insights about your body that, up until now, have never been available. The science of the human body only recently evolved enough to allow scientists to identify and analyze a person's gut microbiome. Your report not only provides you with a road map of your gut bacteria and other microorganisms, but gives direction on how you can potentially use this information to shift the microbiome composition from unhealthy to healthy.

We spend a lifetime trying to learn more about ourselves, especially how our body works and how our health is affected by our habits and behaviors. Traditionally, we have learned what works and what doesn't through trial and error. But experience alone doesn't always give us the information we need. Your report will help you to better understand the factors that can affect how your body ticks.

This report will provide you with the complete picture of your gut microbiome by assessing the metabolic pathways and physiological properties that rely on the gut microbiome to thrive. You will get the information that you need to understand the health of your microbiome and which specific nutrients are needed to optimize your gut microbiome on a very personal and individual level.

What Is Microbiome Testing?

Microbiome testing uses a physical specimen from the body (i.e. stool for the gut microbiome) to reveal information about the bacteria and other microorganisms present in the microbiome of interest. Current technologies allow us to identify microbial communities in various body sites that have important physiological functions. We can then analyze and compare multiple microbiome samples to identify health/disease-associated patterns. Testing enables us to distinguish a healthy from unhealthy microbiome, and subsequently informs us on how to support a healthy microbiome or how to correct an unhealthy microbiome.

Why Is Your Microbiome Important?

The microbiome plays a vital role in human nutrition, digestion, immunity, and disease. Your body is full of trillions of microbes, including bacteria, viruses, and fungi, mostly inside your intestines and on your skin. In fact, in a healthy human adult, microbes outnumber human cells by a ratio of 10:1. These microbes have been working with our bodies to keep us healthy since we were born, and are inextricably linked to our health. In fact, in many disease states, the microbial composition is found to be altered, which likely exacerbates the disease.

Historically, the microbiome has been a poorly understood part of human health, but that has changed in the last couple of decades. And as more studies come out, we are learning more and more about the role of microbes in metabolic disease, infectious disease, cancers, gastrointestinal and digestive disorders, autoimmune disease, and psychological or mental health.

The microbiota contain an incredible amount of versatile metabolic genes that contribute to unique enzymes and biochemical pathways. In this report, we assess these pathways and categorize them into physiological properties or phenotypes. In this way, you are able to gain a greater understanding of how your gut microbes are working together and with your body to optimize your health, and, where appropriate, see specifically where you could improve your nutrition to optimize the health of your microbes, thereby improving the health of your body.

YOUR MICROBIOME RECOMMENDATIONS

Based on your gut microbiome test results, you have 5 over-represented bacteria and 2 under-represented bacteria. Specific foods, nutrients, and supplements may be used to adjust the overall gut microbial balance shifting it toward a more healthy balanced state.

We have identified 3 areas of focus based on your test results to help you achieve this shift and have provided specific recommendations below targeting these areas.

Your Areas of Focus

- ① Prebiotics
- ② Probiotics
- ③ Whole Foods

Nutrients of Interest for You

The following lists of food and supplements will help you achieve a shift toward a more healthy and balanced microbiome.



FOOD

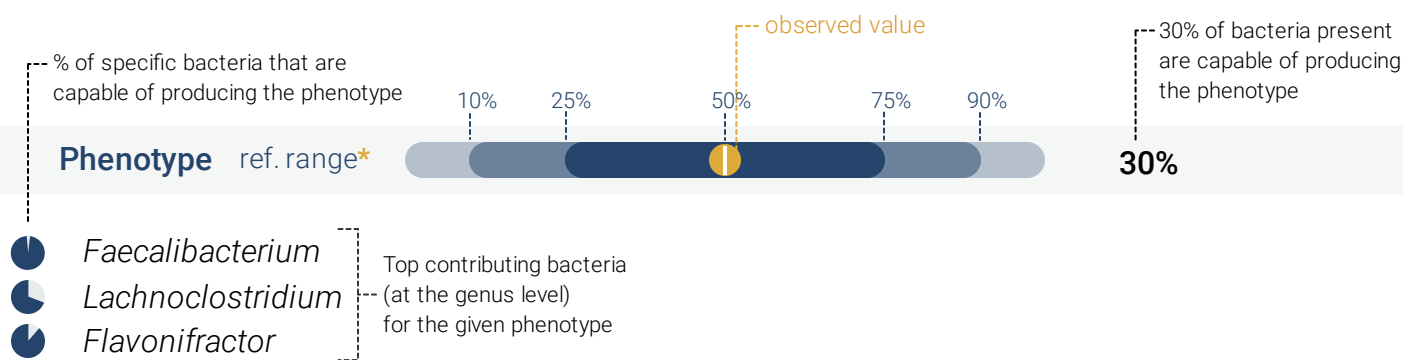
- Fruits such as: guava, bananas, grapefruit, dark berries
- Legumes such as: chickpeas, black-eyed peas, and kidney beans
- Vegetables such as: beets, sweet potatoes, carrots, onions, spinach, kale
- Fermented foods and beverages such as: kombucha, yogurt



SUPPLEMENTS

- Probiotics containing L. rhamnusus
- Citrus Pectins
- FOS

How To Read This Report



* Observed Community Phenotype Index, taxonomic abundance and diversity values are plotted against a corresponding distribution from reference dataset consisting of samples of healthy individuals collected from American Gut Project (AGP) study.

What You'll Learn About Your Gut

On the following pages you will see a summary of your results. You'll learn which physiological functions or phenotypes in your body are within normal range or need attention, and you'll gain an understanding of how your gut bacteria are contributing to the function (whether optimally or not optimally) of each phenotype. You'll also gain insight into the diversity of your gut bacteria, and traditional markers of gut microbiome health, including important ratios and commensal bacteria. The vitamins and nutrients listed on the pages of this report refer to the ability of specific bacteria in your gut to make them. They do not show the actual levels of these vitamins and nutrients in your body.

REPORT SUMMARY



BACTERIAL BALANCE



SHORT CHAIN FATTY ACID PRODUCTION



SUGAR UTILIZATION



VITAMIN PRODUCTION



AMINO ACID PRODUCTION

REPORT SUMMARY



MICROBIOME CHARACTERISTICS

Alpha Diversity

17.5

Alpha diversity is a measure of intra-sample diversity. It shows how phylogenetically broad the bacterial community is.



* calculated using Shannon diversity index (reference dataset: AGP)

Your Top 5 Taxa

- ① *Bacteroides*
- ② *Ruminococcus*
- ③ *Alistipes*
- ④ *Blautia*
- ⑤ *Collinsella*

Ratios

		ref. range	
Firmicutes/Bacteroidetes	IN-RANGE	0.501 - 3.987	1.534
Prevotellaceae/Bacteroidaceae	BELOW AVERAGE	0.001 - 6.932	0.001



SHORT CHAIN FATTY ACID PRODUCTION

Butyrate producers	IN-RANGE	<i>Alistipes, Dysosmobacter, Faecalibacterium</i>
Propionate producers	IN-RANGE	<i>Bacteroides, Alistipes, Blautia</i>
Acetate producers	BELOW AVERAGE	<i>Bacteroides, Blautia, Collinsella</i>



SUGAR UTILIZATION

FOS utilizers	IN-RANGE	<i>Bacteroides, Blautia, Phocaeicola</i>
Arabinose utilizers	IN-RANGE	<i>Bacteroides, Blautia, Phocaeicola</i>
Inositol utilizers	ABOVE AVERAGE	<i>Blautia, Dorea, Roseburia</i>
Lactose utilizers	BELOW AVERAGE	<i>Collinsella, Bacteroides, Blautia</i>

REPORT SUMMARY



VITAMIN PRODUCTION

Thiamine (B1) producers	IN-RANGE	<i>Bacteroides, Blautia, Phocaeicola</i>
Riboflavin (B2) producers	BELOW AVERAGE	<i>Bacteroides, Alistipes, Blautia</i>
Niacin (B3) producers	IN-RANGE	<i>Bacteroides, Ruminococcus, Alistipes</i>
Pantothenate (B5) producers	BELOW AVERAGE	<i>Bacteroides, Alistipes, Phocaeicola</i>
Pyridoxine (B6) producers	IN-RANGE	<i>Bacteroides, Alistipes, Collinsella</i>
Biotin (B7) producers	IN-RANGE	<i>Bacteroides, Phocaeicola, Parabacteroides</i>
Folate (B9) producers	IN-RANGE	<i>Bacteroides, Alistipes, Blautia</i>
Cobalamin (B12) producers	IN-RANGE	<i>Bacteroides, Blautia, Collinsella</i>



AMINO ACID PRODUCTION

Cysteine producers	IN-RANGE	<i>Bacteroides, Ruminococcus, Blautia</i>
Tryptophan producers	IN-RANGE	<i>Bacteroides, Ruminococcus, Blautia</i>
Histidine producers	ABOVE AVERAGE	<i>Bacteroides, Ruminococcus, Blautia</i>



BACTERIAL BALANCES

OVERREPRESENTED BACTERIA

ref. range

<i>Bacteroides</i>	ABOVE AVERAGE	1.7 - 24.1%	20.1%
<i>Ruminococcus</i>	HIGH	0 - 5.3%	12.3%
<i>Alistipes</i>	ABOVE AVERAGE	0.4 - 12.4%	7.8%
<i>Blautia</i>	HIGH	0.8 - 5.1%	7.1%
<i>Collinsella</i>	HIGH	0 - 0.4%	6.0%

IN-RANGE BACTERIA

ref. range

<i>Phocaeicola</i>	IN-RANGE	1 - 18%	5.3%
<i>Lachnospiraceae</i>	IN-RANGE	0 - 6.4%	2.1%
<i>Parabacteroides</i>	IN-RANGE	0.2 - 3.1%	1.6%
<i>Roseburia</i>	IN-RANGE	0.1 - 4.9%	1.3%
<i>Eubacteriales</i>	IN-RANGE	0 - 3.2%	1.3%

UNDERREPRESENTED BACTERIA

ref. range

<i>Faecalibacterium</i>	BELOW AVERAGE	1.8 - 16.9%	3.0%
<i>Fusicatenibacter</i>	BELOW AVERAGE	0.1 - 1.3%	0.1%

COMMENSAL BACTERIA OF INTEREST

ref. range

<i>Roseburia</i>	IN-RANGE	0.1 - 4.9%	1.3%
<i>Bacteroides</i>	ABOVE AVERAGE	1.7 - 24.1%	20.1%
<i>Prevotella</i>	IN-RANGE	0 - 28.6%	0.0%



SHORT CHAIN FATTY ACID PRODUCTION

Short chain fatty acids (SCFA) are the beneficial products of carbohydrate fermentation that are associated with a diverse microbiome and overall health. The percentage (on the scale from 0 to 100) of SCFAs producers is shown along with top contributors.

Butyrate producers

1.3 - 67.0%



27.3%

Butyrate is produced by microbial fermentation and plays an integral role in maintaining digestive health by regulating gene expression, cell differentiation, gut tissue development, immune modulation, oxidative stress reduction, and more.



Alistipes



Dysosmobacter



Faecalibacterium

Propionate producers

4.0 - 89.7%



49.4%

Propionate is known to have a significantly positive impact on the immune system, including improving lung health and increasing resistance to infection. It is typically converted to glucose in the liver and may prevent some lipogenic effects of acetate.



Bacteroides



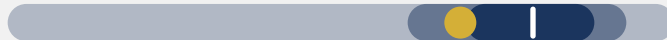
Alistipes



Blautia

Acetate producers

13.4 - 100.0%



71.1%

Acetate production is tightly regulated within the microbiome. It is largely utilized for cholesterol synthesis and lipogenesis, and excessive production combined with insufficient butyrate production can lead to fat gain, particularly around the liver.



Bacteroides



Blautia



Collinsella



SUGAR UTILIZATION

Polysaccharides and mono/oligosaccharides are utilized for biosynthesis and energy metabolism in gut colonizing bacteria. These phenotypes display the potential of present bacteria to utilize the following sugars. The percentage (on the scale from 0 to 100) of sugars utilizers is shown along with top contributors.




FOS utilizers

3.1 - 96.6%



48.2%

Fructo-oligosaccharides (FOS) is a prebiotic with positive impact on the diversity and abundance of the microbiome. Dietary sources of FOS are onions, garlic, chicory and artichokes. Bacteria who utilize FOS can be helpful in weight loss and correcting constipation.

-  *Bacteroides*
-  *Blautia*
-  *Phocaeicola*




Arabinose utilizers

0.1 - 78.0%



20.7%

Arabinose is a prebiotic that promotes diversity within the microbiome. Dietary sources of arabinose are whole grains, apples, citrus fruits and fermented foods. Bacteria who utilize arabinose can be helpful with blood sugar balancing and metabolic syndrome.

-  *Bacteroides*
-  *Blautia*
-  *Phocaeicola*




Inositol utilizers

0.5 - 56.3%



8.8%

Inositol is important for microbiome adaptation and diversity. Dietary sources are fiber rich foods, such as beans, nuts and seeds, citrus and melons. Inositol can be beneficial for metabolic syndrome, lipid imbalances, and insulin resistance.

-  *Blautia*
-  *Dorea*
-  *Roseburia*




Lactose utilizers

3.0 - 83.5%



30.6%

Lactose intolerance is a common medical problem marked by bloating, diarrhea, abdominal pain, or cramping, resulting from a reduction in the lactase enzyme. Colonic bacterial adaptation can significantly improve symptoms of intolerance.

-  *Collinsella*
-  *Bacteroides*
-  *Blautia*






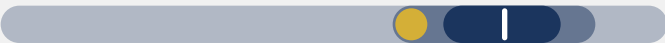
VITAMIN PRODUCTION

B Vitamins are precursors of nearly all metabolic coenzymes universally essential in all lifeforms. With the exception of B12, which is dispensable for some bacterial species, all B vitamins that are not able to be produced, must be retrieved through exogenous sources. The percentage (on the scale from 0 to 100) of the vitamins producers is shown along with top contributors.




Thiamine (B1) producers 1.3 - 96.8%  49.1%

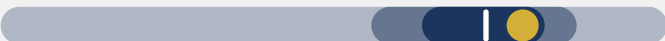
Thiamin is a water-soluble B vitamin that plays a critical role in energy metabolism, particularly in the brain and nervous system, as well as in the growth and function of cells. Some bacteria are able to produce thiamin, while others are not.

-  *Bacteroides*
-  *Blautia*
-  *Phocaeicola*




Riboflavin (B2) producers 35.7 - 98.5%  64.8%


Riboflavin is a B-vitamin that is a component of two important coenzymes required for energy production and fatty acid metabolism, as well as metabolism of drugs and steroids. Some bacteria are able to produce riboflavin, while others are not.

-  *Bacteroides*
-  *Alistipes*
-  *Blautia*




Niacin (B3) producers 5.2 - 98.4%  81.5%

Niacin is a B-vitamin required for the coenzyme NAD, which is involved in more than 400 enzymatic reactions in the body. Notably, NAD works to convert food into energy for our cells. Some bacteria are able to produce niacin, while others are not.

-  *Bacteroides*
-  *Ruminococcus*
-  *Alistipes*

Pantothenate (B5) producers 9.8 - 97.5%  47.9%

Pantothenate is a B-vitamin that plays a major role in energy production, particularly the breakdown of fatty acids. It may play a role in reducing lipid production in certain individuals. Some bacteria are able to produce pantothenate, while others are not.

-  *Bacteroides*
-  *Alistipes*
-  *Phocaeicola*



VITAMIN PRODUCTION

Pyridoxine (B6) producers

23.1 - 97.8%



63.4%

Pyridoxine is a B-vitamin required for coenzymes that play a role in enzymatic reactions mostly concerning protein metabolism, immune function, and brain development during pregnancy. Some bacteria are able to produce pyridoxine, while others are not.

- Bacteroides*
- Alistipes*
- Collinsella*

Biotin (B7) producers

2.4 - 88.5%



32.7%

Biotin is a B-vitamin that plays a critical role in energy production, histone modification, gene regulation, and cell signaling. Signs of deficiency include skin rashes, hair loss, and brittle nails. Some bacteria are able to produce biotin, while others are not.

- Bacteroides*
- Phocaeicola*
- Parabacteroides*

Folate (B9) producers

32.7 - 97.9%



72.2%

Folate is a B-vitamin that is required to synthesize DNA, metabolize amino acids, enable methylation, and prevent anemia, as well as protect against neural tube defects in pregnancy. Some bacteria are able to produce folate, while others are not.

- Bacteroides*
- Alistipes*
- Blautia*

Cobalamin (B12) producers

4.3 - 93.6%



57%

Cobalamin is a B-vitamin that is important in synthesizing DNA and red blood cells, brain and nervous system function, and metabolism. It is required to prevent megaloblastic anemia. Some bacteria are able to produce cobalamin, while others are not.

- Bacteroides*
- Blautia*
- Collinsella*







AMINO ACID PRODUCTION

Amino acids are indispensable for the microbiome health. Bacteria that are not capable of producing amino acids require exogenous sources from diet or other bacteria. The percentage (on the scale from 0 to 100) of the amino acids producers is shown along with top contributors.




Cysteine producers 44.2 - 99.8%  88.7%

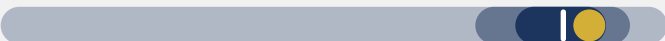
Cysteine is a nonessential sulfur containing amino acid in the methionine -> homocysteine pathway and one of three amino acids that build glutathione. Cysteine is beneficial as an antioxidant, assists with collagen formation and immune system regulation.

-  *Bacteroides*
-  *Ruminococcus*
-  *Blautia*




Tryptophan producers 15.3 - 97.3%  67%

Tryptophan is an essential amino acid with an important role in the gut-brain axis (GBS). Tryptophan is important in the production of neurotransmitters that regulate mood, particularly depression, and intestinal barrier integrity.

-  *Bacteroides*
-  *Ruminococcus*
-  *Blautia*

Histidine producers 15.7 - 99.1%  91.5%

Histidine is an essential amino acid and precursor to histamine. Histidine and its derivatives have important roles in the immune response, blood clotting pathways, and detoxification.

-  *Bacteroides*
-  *Ruminococcus*
-  *Blautia*