AMILI

Advancing Human Health Through Microbiome Science

Gut Microbiome Profile

📞0917-777-LABS(5227)

🌐www.singaporediagnostics.com

Report Number:	Prepared For:	Sample Received:
PDF1-TEST-1111	**Jane Doe**	Date: **14-10-2023**

Thank you for choosing the AMILI Gut Health Test!

Did you know that there are trillions of microbes that live in and on us? One of the highest concentrations of these microbes can be found in the gut (known as the gut microbiome). The gut microbiome, weighing up to 2 kilograms, was thought of to be responsible only for digestion. This is incorrect and in recent years, research has found that the gut microbiome is integral to many seemingly unconnected health aspects such as mental well-being, cardiovascular health, and many chronic diseases. The role in digestion has now been correctly identified to be much more than minor and depending on one's gut microbiome profile, the differences in sugar, insulin and fat responses can be 8-10x different for the same foods!

We hope that you find this report useful, and we encourage you to come back for a re-test with AMILI every 3-6 months to track changes in your microbiome.

We would like to remind you that this is not a diagnostic evaluation but an informational report. You should always seek the advice of your healthcare provider with any questions you have regarding diagnosis, cure, treatment, mitigation, or prevention of any disease or medical condition/impairment and the status of your health.
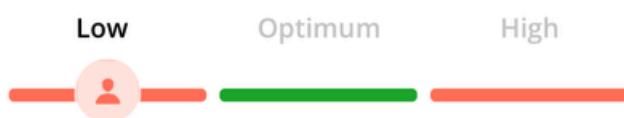
Yours,
Dr Jeremy Lim
Chief Executive Officer

Jeremy Lim

Microbiome Overview
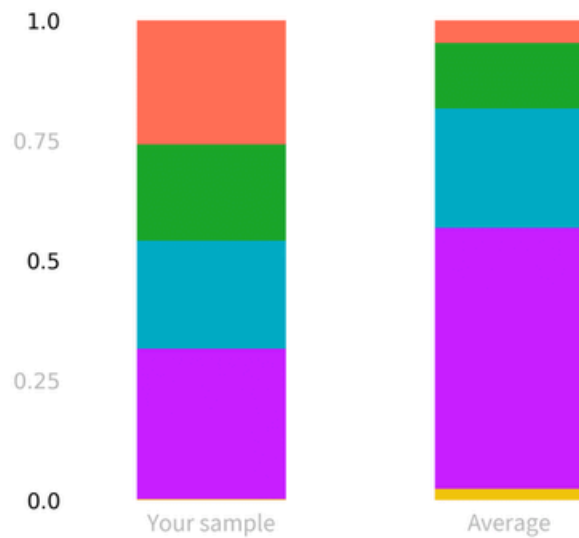
- **PROTEOBACTERIA** is linked to inflammation, obesity, cancer, and gastrointestinal disorders. [1]

- **ACTINOBACTERIA** ensures gut balance but is also associated with aging, Alzheimer's and autism. [2]

- **BACTEROIDOTA** digest starch and dietary fibre, generating short-chain fatty acid (SCFA) with anti-inflammatory properties promoting weight-loss and reducing cancer risk. [3]

- **FIRMICUTES** produce butyrate, protecting the gut lining, anti-inflammatory, balance blood sugar and reduce cancer risk. They harvest energy efficiently and promote fat absorption. [4]

- **FUSOBACTERIA & OTHERS** encourage biofilm formation, and at a high abundance, contribute negatively to the gut microbiome by producing toxins that cause inflammation and tissue damage. [5]

Firmicutes/Bacteroidota Ratio

The Firmicutes/Bacteroidota Ratio refers to the abundance of Firmicutes with respect to the abundance of Bacteroidota.
A high ratio i.e. high Firmicutes and low Bacteroidota is linked to the development of obesity, whereas a low ratio i.e low Firmicutes and high Bacteroidota is linked to the development of Inflammatory Bowel Disease. [6]

Low	Optimum	High

Your score is **poor** due to a low F/B ratio, making you more susceptible to unfavourable gut conditions.

Diversity Index

Diversity of strains refers to the different bacteria that make up your microbiome, and may diminish with age or due to lifestyle.
A high diversity is associated with a healthy and resilient gut while a low diversity is prone to imbalances and disease. [7]

Poor	Good	Great

Your microbiome diversity is at a suitable level but there is still room to make it more diverse. Hence, your score is **good**.

Think Well looks at processes in your gut that can have a profound effect on sleep, focus, mood and mental performance.

Live Well looks at the bacteria and the chemicals they produce which contribute to heart health, liver health, digestive health and other organ functions.

Feel Well tracks how food is broken down into its vital components and tracks its uptake and use in your body through the microbiome.

Think Well Gut-Brain Axis

The gut and brain are very closely connected, both physically and biochemically. They 'communicate' through a complex network known as the 'gut-brain axis'.

Overall score is **poor**, which means that the gut microbiome is not living up to its fullest potential in influencing feelings and mood.

GABA
Stress Management

⏱ Your Results: (Good)

A **neurotransmitter** that calms the brain and regulates sleep. [8]

Helps with anxiety and stress, regulates gut barrier function, and gastric acid secretion.

- Abundance of bacterial groups associated with GABA production is reaching an optimal level, resulting in a **good** score.
- High GABA levels promote healthy gut function, overall well-being, and induce **calmness and relaxation**.

Serotonin
Mood Regulation

⏱ Your Results: (Good)

A **neurotransmitter** that affects mood. [9]

Regulates emotional behaviour, bowel movements, sleep and more.

- Abundance of bacterial groups associated with serotonin production close to an optimal level, resulting in a **good** score.
- High serotonin levels promote healthy gut function and mood regulation, leading to good **focus and emotional stability**.

Tryptophan
Cell Communication

Your Results: (Poor)

- Abundance of bacterial groups associated with tryptophan production is low, resulting in a **poor** score.
- There is a low microbial synthesis of tryptophan, which may impact **serotonin production**.

An **essential amino acid** for serotonin. [10]

Building block of major biomolecules in the body and helps in proper nervous system functioning.

Glutamate
Brain Signalling

Your Results: (Poor)

- Abundance of bacterial groups associated with glutamate production is low, resulting in a **poor** score.
- Inadequate microbial production of glutamate may negatively affect **gut functions and gut-brain communication**.

An **excitatory neurotransmitter**. [11]

Facilitates nerve signaling, energy production in the brain, and helps regulate gut function and gut-brain communication.

⚡ | Live Well Immunity and Gut Health

The gut microbiota produces various enzymes and microbe-derived metabolites to regulate the host's metabolism, which supports general well-being and promotes health maintenance.

Overall score is **good**, which means that the gut microbiome is on its way to positively influencing the heart, gut, and liver health.

Good
Poor **6** Great

TMAO

Heart Health

⚙ Your Results: (Poor)

A toxic **metabolite** produced after the consumption of full-fat dairy and red meats. [12]

Strongly associated with the increased potential of cardiovascular conditions.

• Abundance of bacterial groups associated with TMAO production processes is high, resulting in a **poor** score.

• Gut microbiome is producing a higher than normal amounts of TMAO or TMA, which may increase the potential for **cardiovascular conditions**.

Cysteine & Derivatives

Inflammation Management

⚙ Your Results: (Poor)

A sulfur-containing **amino acid**. [13]

Important for protein synthesis, antioxidant defense, and the regulation of cellular metabolism.

• Abundance of bacterial groups responsible for cysteine production is low, resulting in a **poor** score.

• Gut microbiome is producing insufficient cysteine, impairing the body's ability to **manage inflammation, produce collagen and regulate immune function**.

Indole & Indole Derivatives
Gut Lining Protection

Your Results: (Good)

A heterocyclic **organic compound** produced though bacterial metabolism of tryptophan. [14]

An antioxidant with anti-inflammatory properties, and helps protect the gut lining.

- Abundance of bacterial groups responsible for indole production is high and approaching the optimum level, resulting in a **good** score.

- Gut microbiome is producing enough indole to support the maintenance of the **gut lining and suppress bacterial virulence gene expression**.

Bile Acids Deconjugation
Fat Metabolism

Your Results: (Good)

Conversion of bile acids to their **deconjugated form** in the small intestine and colon. [15]

Deconjugated bile acids can be converted to secondary bile acids, which play a crucial role in energy metabolism and nutrient absorption.

- Abundance of bacterial groups responsible for bile acid deconjugation high and approaching the optimum level, resulting in a **good** score.

- Deconjugated bile acids serve as a substrate for specific gut bacteria, promoting their **growth** and **contributing to microbiome diversity**.

Imidazole Propionate
Glucose Regulation

Your Results: (Good)

Metabolite commonly found in proteins. [16]

Implicated in the development of insulin resistance and type 2 diabetes.

- Abundance of bacterial groups with imidazole propionate production is moderate and approaching the optimum level, resulting in a **good** score.

- Gut microbiome is producing levels within the normal range, reducing the potential for **impaired glucose metabolism and regulation**.

Glutathione Pathways
Oxidative Stress Management

Your Results: (Great)

> **Metabolic pathways** that detoxify reactive oxygen species (ROS) to reduce oxidative stress. [17]
>
> Prevent tissue damage and inflammation caused by oxidative stress, potentially damaging gut health.

- Abundance of bacterial groups associated with glutathione pathways is at a high level, resulting in a **great** score.

- Gut microbiome is efficiently metabolising glutathione, indicating that there are **robust antioxidant mechanisms in place that minimize oxidative damage**.

Glycine & Butanoate
Anti-Inflammation

Your Results: (Great)

> Glycine is an essential **amino acid**, and butanoate is a **short-chain fatty acid** produced by gut bacteria from dietary fibers. [18]
>
> Both play significant roles in various metabolic processes, protein synthesis, gut health, and inflammation regulation.

- Abundance of bacterial groups associated with glycine and butanoate metabolism is high, resulting in a **great** score.

- Gut microbiome exhibits a high metabolism of glycine and butanoate, leading to a substantial production of **anti-inflammatory compounds**.

L-citrulline
Intestinal Permeability

Your Results: (Good)

Non-essential amino acid that plays an important role in gut health, such as gut barrier function. [19]

Modulates tight junction proteins which are crucial for maintaining the integrity of intestinal epithelial cells.

- Abundance of bacterial groups associated with L-citrulline metabolism is at a moderate level, resulting in a **good** score.

- A well-functioning intestinal barrier helps maintain low permeability, reducing potential of harmful substances entering bloodstream, **systemic inflammation and digestive issues**.

Short Chain Fatty Acids
Intestinal Health

Your Results: (Good)

Organic compounds produced by gut microbes during dietary fibre fermentation. [20]

Provides energy to the colon, facilitates colonic muscle contractions, maintains integrity and function of the gastrointestinal barrier and regulates immune response.

- Abundance of bacterial groups associated with production of SCFAs is at a moderate level, resulting in a **good** score.

- Moderate levels of SCFAs suggests a balanced microbial community and **sufficient dietary fiber intake for a healthy gut barrier**.

♡ | Feel Well   Metabolism and Digestion

The gut microbiome is largely responsible for digesting food that is consumed. In doing so, it generates energy that fuels a person's cells and, by extension, them.

Overall score is **good**, which means that the gut microbiome is on its way to efficiently metabolising food and harvesting energy.

Good

Poor   Great

6

Carbohydrate
Carbohydrate Digestion

⊙ Your Results: (Great)

The ability to digest the **main energy source** in the Asia diet. [21]

The body uses them to derive energy and when undigested by the gut, it causing gas and bloating.

• Abundance of bacterial groups associated with carbohydrate breakdown levels is high, resulting in a **great** score.

• Gut microbiome exhibits excellent energy harvest from carbohydrates, leading to optimal **energy utilisation**, enhanced **nutrient absorption**, and robust **metabolic function**.

Protein
Protein Digestion

⊙ Your Results: (Great)

The ability to **breakdown protein** into amino acids. [22]

Required for the breakdown of dietary proteins into absorbable amino acids which allows reabsorption for growth, muscle repair and protein synthesis.

• Abundance of bacterial groups associated with protein metabolism is high, resulting in a **great** score.

• Gut microbiome is highly efficient at digesting proteins and utilising them for muscle repair and maintenance, promoting optimal **muscle recovery and supporting substantial muscle growth**.

Fat
Fat Digestion

⊘ Your Results: (Good)

The ability to **digest fat to form essential fatty acids**. [23]

Help to maintain healthy skin and hair, insulate body organs against shock and maintain body temperature.

- Abundance of bacterial groups associated with fat breakdown is approaching the optimum level, resulting in a **good** score.

- Gut microbiome is efficient at digesting fats and utilising them for energy production, **supporting fat burn and energy harvest**.

Fibre
Fibre Digestion

⊘ Your Results: (Good)

The ability to digest and **ferment fibre**. [24]

Fiber fermentation promotes short chain fatty acid production and regularity in bowel movements.

- Abundance of bacterial groups involved in fibre fermentation is approaching the optimum level, resulting in a **good** score.

- Gut microbiome effectively ferments fibre, leading to the production of adequate levels of SCFAs and supporting a healthy **gut fermentation** process.

Branched Chain Amino Acids
Muscle Growth & Repair

⊘ Your Results: (Poor)

Group of **three essential amino acids** - leucine, isoleucine, and valine.

Stimulates the building of protein in muscle and in certain quantities regulate glucose levels in blood. [25]

- Abundance of bacterial groups associated with the utilisation of BCAAs low, resulting in a **poor** score.

- Gut microbiome shows limited capacity to metabolise BCAAs, potentially hindering **protein stimulation and muscle function**.

Vitamin B1 Biosynthesis

⊘ Your Results: (Poor)

Plays an essential role in **metabolism**. [26]

Needed for effective utilisation of carbohydrates, by helping convert nutrients into energy.

- Abundance of bacterial groups involved in Vitamin B1 production is low, resulting in a **poor** score.
- Gut microbiome exhibits limited ability to produce vitamin B1, potentially leading to inadequate levels for **carbohydrate metabolism and overall health**.

Vitamin B2 Biosynthesis

⊘ Your Results: (Great)

Essential for **energy production** and metabolism. [26]

Maintains healthy skin, eyes, and nervous system function.

- Abundance of riboflavin-producing bacterial groups is high, resulting in a **great** score.
- Gut microbiome demonstrates excellent riboflavin production, ensuring a thriving microbial community, optimal gut health, and robust **energy production**.

Vitamin B6 Biosynthesis

⊘ Your Results: (Poor)

Keeps the **nervous** and **immune system** healthy. [26]

Involved in amino acid metabolism, red blood cell production, and the synthesis of neurotransmitters.

- Abundance of bacterial groups associated with vitamin B6 production is low, resulting in a **poor** score.
- This may impair amino acid metabolism, red blood cell production, neurotransmitter synthesis, and overall **gut microbiome function**.

Vitamin B7 Biosynthesis

⊗ Your Results: (**Great**)

Plays an important role in **liver metabolism** and in the functioning of the **nervous system**.[26]

Essential for carbohydrate and fat metabolism, and to prevent thinning of hair.

- Abundance of bacterial groups associated with vitamin B7 production is high, resulting in a **great** score.

- This contributes to the optimal maintenance of carbohydrate and fat metabolism, as well as promotes excellent skin, nail, and hair health. It supports robust **liver metabolism** and optimal functioning of the **nervous system**.

Vitamin B9 Biosynthesis

⊗ Your Results: (**Poor**)

An essential vitamin that naturally occurs as **folate**. [26]

Needed for formation of red and white blood cells and cellular processes, and is responsible for production of DNA and RNA.

- Abundance of bacterial groups associated with vitamin B9 production is low, resulting in a **poor** score.

- This may potentially impair the formation of red and white blood cells, cellular processes, and the production of **DNA and RNA**.

Vitamin B12 Biosynthesis

⊕ Your Results: (Good)
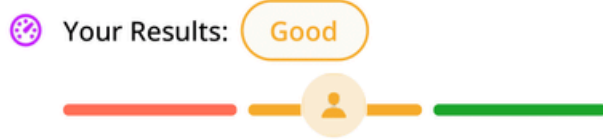
Important for **neurological function** and **red blood cell formation**. [26]

Helps in development of brain and nerve cells, and binds to proteins in food we consume.

- Abundance of bacterial groups associated with vitamin B12 production is approaching the optimal level, resulting in a **good** score.

- This helps maintain neurological function and red blood cell count, preventing **fatigue** and reducing the likelihood of **gastrointestinal issues**.

Vitamin K Biosynthesis

⊕ Your Results: (Good)

Essential **vitamin** for bone health. [27]

Critical for blood clotting, bone metabolism, and cardiovascular health.

- Abundance of bacterial groups associated with vitamin K synthesis is approaching the optimal level, resulting in a **good** score.

- This supports adequate vitamin K production, promoting optimal **bone health** and other vitamin K-dependent processes. The balance of bacterial fermentation ensures a healthy synthesis of vitamin K.

Supplement Recommendations
Enriched with prebiotics and postbiotics

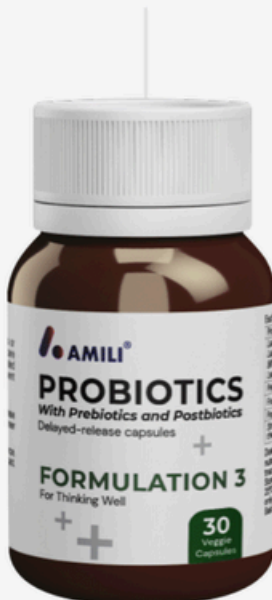| Good	Good	Good
Poor **3** Great	Poor **6** Great	Poor **6** Great
🧠 Think Well	⚡ Live Well	♥ Feel Well

We Recommend

Formulation 3 for Thinking Well

Your report indicates poor Think Well scores. However, this is no time to worry. Formulation 3 is designed to improve your mental well-being and contains *Bifidobacterium breve* which has been shown to reduce stress, improve mood and memory.

Probiotic Strains:

Lactobacillus paracasei, Lactobacillus plantarum, Bifidobacterium breve, Lactobacillus rhamnosus

Total CFU (colony forming units): 15 billion

Postbiotic Strains:

S. salivarius ssp. thermophilus
2 billion cells per capsule

Prebiotics:

Fructooligosaccharides (FOS)
30mg per capsule

Food Recommendations

Poor **3** Good Great

Good **6** Poor Great

Good **6** Poor Great

🧠 | **Think Well**

⚡ | **Live Well**

♡ | **Feel Well**

Banana [28] Fruit

As a source of potassium and catechins, bananas protect cardiovascular health by lowering blood pressure and reducing risk for heart disease. Bananas also contain soluble fibre that support weight loss and better blood glucose control.

1 medium

Green Guava [29] Fruit

Guava is an excellent source of blood pressure-lowering potassium. Its dietary fiber also nourishes beneficial gut bacteria and promotes a diverse microbiome.

1 medium

French Bean [30] Legumes

Fibre in french beans help lower cholesterol levels, and antioxidant carotenoids and phenolic compounds help prevent oxidation of cholesterol and decrease risk for coronary heart disease and high blood pressure.

1 cup

Soybean Sprout [31] Legumes

Soybean sprouts provide potassium and fibre which work to lower blood pressure, reducing the cardiovascular risk. Potassium also plays a vital role in neural signaling and muscle contraction.

1 cup

Kiwi [32] Fruit

Kiwi is rich in various antioxidants including vitamin C, vitamin E and polyphenols. They have protective effect against heart diseases, may help reduce body fat mass, improve blood pressure and regulating inflammatory responses.

1 medium

Disease Risk

## How do I interpret these results?

The graphs in these sections display your likelihood of falling in a particular range based on your gut microbiome composition and results.

If you tend more to the left, it means that your microbiome coupled with your genetic makeup resembles that of a healthy one; and if you tend more to the right, your microbiome coupled with your genetic makeup resembles that of an unhealthy patient.

It is not uncommon to see anomalies, as this suggests that having healthy samples in the risk range is the reason why the graphs are not deterministic of the result.

With these graphs, you can see how there is an evident correlation between the microbes in your gut and potential diseases.

Obesity
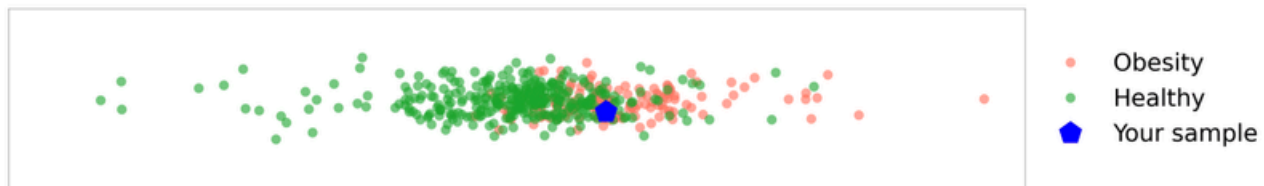
- Obesity is a medical condition that occurs when a person carries excess weight or body fat that might affect their health.

- The dysbiosis of gut microbiota is closely related with obesity, and a less diverse gut makes an individual more prone to obesity. Bacterial diversity and richness contributes to processes such as metabolism, which helps to maintain weight.

Non-Alcholic Fatty Liver Disease (NAFLD)
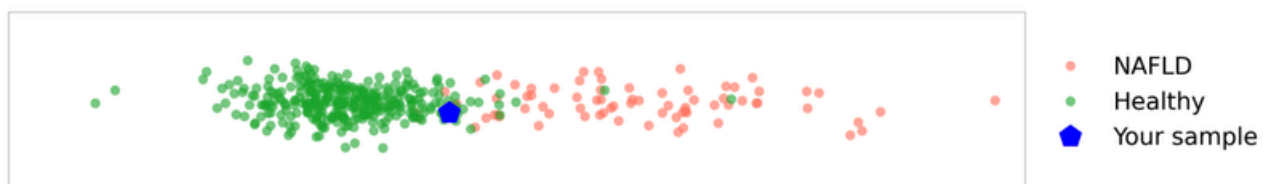
- NAFLD is a term describing the range of diseases that are caused due to a build-up of fat in the liver.

- In some people, fat causes inflammation and damages liver cells.

- One type of NAFLD, non-alcoholic steatohepatitis (NASH), can cause scarring of the liver, leading to cirrhosis.

Inflammatory Bowel Disease (IBD)
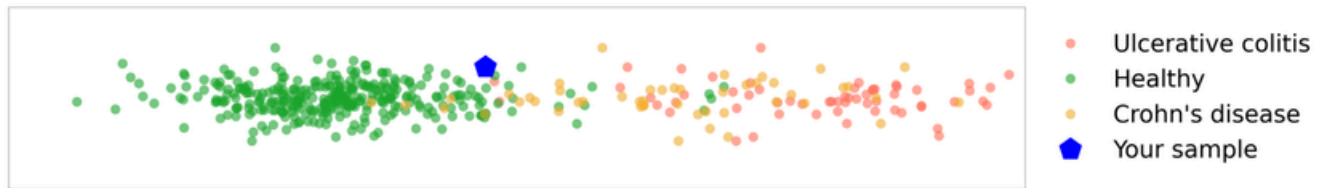
- IBD is an umbrella term used to describe disorders that involve chronic inflammation of the digestive tract.

- Types of IBD include:

  - **Ulcerative colitis**: This condition causes long-lasting inflammation and sores (ulcers) in the innermost lining of the large intestine (colon) and rectum.

  - **Crohn's Disease**: This type of IBD is characterized by inflammation of the lining of the digestive tract, which often spreads deep into affected tissue.

Colorectal Cancer (CRC)
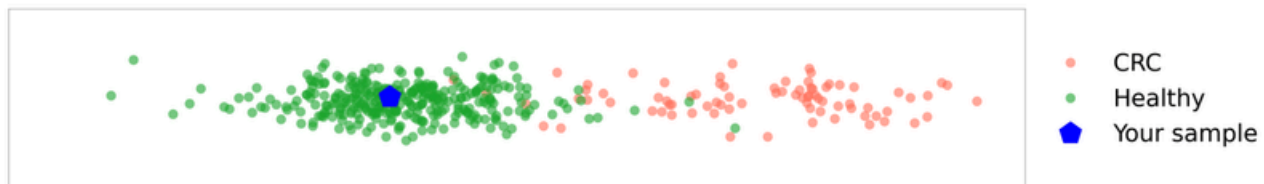
- CRC covers cancers of the bowel, colon and rectum.

- In close to 75-95% of CRC cases, there is little or no underlying genetic risks.

- The risk factors for CRC are age, diet, obesity, smoking and red meat.
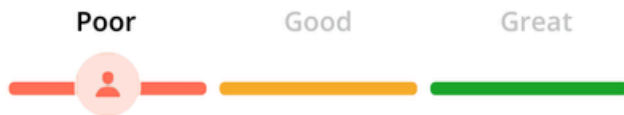
Type 2 Diabetes Mellitus (T2DM)
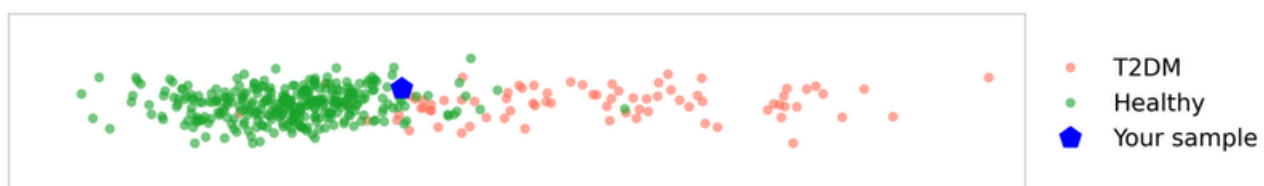
- T2DM is characterised by high blood glucose content, insulin resistance and the relative lack of insulin.

- It makes up close to 90% of diabetes cases worldwide.

- A combination of lifestyle and genetic causes attribute to T2DM.

More Health Insights

Allergy

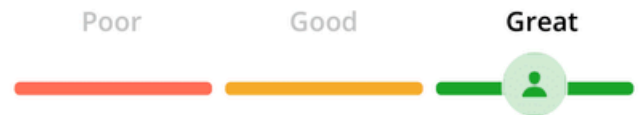| Poor	Good	Great

Allergies can be influenced by the gut microbiome's ability to produce histamine. Higher histamine production can contribute to increased allergic reactions and symptoms. [33]

The abundance of bacterial groups associated with histamine production is relatively high, indicating a **poor** score.

Detoxification

Poor	Good	Great

Detoxification is the body's process of eliminating harmful substances.

It involves two steps: glucoronidation, where toxins bind with glucoronate, and glucuronide degradation, where the combinations break down, releasing the harmful substances for elimination. [34]

The abundance of bacterial groups associated with detoxification is on the higher side, indicating a **great** score.

Gut Microbial Balance

Poor	Good	Great

A healthy gut has more beneficial bacteria than harmful ones, as pathogens can cause inflammation and damage.

The abundance of human pathogens is compared to a healthy reference database; lower pathogen levels indicate a higher ratio of good to bad bacteria. [35]

The abundance of pathogenic bacteria is higher than the average level detected in healthy subjects, indicating a **poor** score.

Iron Optimization

Poor	Good	Great

Heme is essential for oxygen transport in red blood cells as part of the protein haemoglobin.

Heme produced by the gut microbiome serves as an iron supply for the body's needs. Moreover, gut microbes use heme as an energy and carbon source. [36]

The abundance of bacterial groups associated with heme production is at a moderate level, indicating a **good** score.

References

1. Jandhyala, S. (2015). Role of the normal gut microbiota. World Journal Of Gastroenterology, 21(29), 8787. doi: 10.3748/wjg.v21.i29.8787

2. Arumugam, M., Raes, J., Pelletier, E. et al. (2011). Enterotypes of the human gut microbiome. Nature 473, 174-180. doi: 10.1038/nature09944

3. Flint, H., & Duncan, S. (2014). Bacteroides and Prevotella. Encyclopedia Of Food Microbiology, 203-208. doi: 10.1016/b978-0-12-384730-0.00031-8

4. Rinninella, E., Raoul, P., Cintoni, M., Franceschi, F., Miggiano, G., Gasbarrini, A., & Mele, M. (2019). What is the Healthy Gut Microbiota Composition? A Changing Ecosystem across Age, Environment, Diet, and Diseases. Microorganisms, 7(1), 14. doi: 10.3390/microorganisms7010014

5. Bashir, Arif, et al. "Fusobacterium Nucleatum, Inflammation, and Immunity: The Fire within Human Gut." Tumor Biology, vol. 37, no. 3, Mar. 2016, pp. 2805–10. DOI.org (Crossref), https://doi.org/10.1007/s13277-015-4724-0.

6. Magne, Fabien et al. "The Firmicutes/Bacteroidetes Ratio: A Relevant Marker of Gut Dysbiosis in Obese Patients?." Nutrients vol. 12,5 1474. 19 May. 2020, doi:10.3390/nu12051474

7. Yin, Lei et al. "Association Between Gut Bacterial Diversity and Mortality in Septic Shock Patients: A Cohort Study." Medical science monitor : international medical journal of experimental and clinical research vol. 25 7376-7382. 1 Oct. 2019, doi:10.12659/MSM.916808

8. Duranti, Sabrina et al. "Bifidobacterium adolescentis as a key member of the human gut microbiota in the production of GABA." Scientific reports vol. 10,1 14112. 24 Aug. 2020, doi:10.1038/s41598-020-70986-z

9. Stasi, Cristina et al. "The Relationship Between the Serotonin Metabolism, Gut-Microbiota and the Gut-Brain Axis." Current drug metabolism vol. 20,8 (2019): 646-655. doi:10.2174/1389200220666190725115503

10. Gao, Kan et al. "Tryptophan Metabolism: A Link Between the Gut Microbiota and Brain." Advances in nutrition (Bethesda, Md.) vol. 11,3 (2020): 709-723. doi:10.1093/advances/nmz127

11. Chen, Yijing et al. "Regulation of Neurotransmitters by the Gut Microbiota and Effects on Cognition in Neurological Disorders." Nutrients vol. 13,6 2099. 19 Jun. 2021, doi:10.3390/nu13062099

12. Liu, Yarong, and Min Dai. "Trimethylamine N-Oxide Generated by the Gut Microbiota Is Associated with Vascular Inflammation: New Insights into Atherosclerosis." Mediators of inflammation vol. 2020 4634172. 17 Feb. 2020, doi:10.1155/2020/4634172

References

13   Dopkins, Nicholas, et al. 'The Role of Gut Microbiome and Associated Metabolome in the Regulation of Neuroinflammation in Multiple Sclerosis and Its Implications in Attenuating Chronic Inflammation in Other Inflammatory and Autoimmune Disorders'. Immunology, vol. 154, no. 2, Wiley, 27 Feb. 2018, pp. 178–185. Crossref, doi:10.1111/imm.12903.

14   Kumar, Aman, and Vanessa Sperandio. "Indole Signaling at the Host-Microbiota-Pathogen Interface." mBio vol. 10,3 e01031-19. 4 Jun. 2019, doi:10.1128/mBio.01031-19

15   Guzior, Douglas V., and Robert A. Quinn. 'Review: Microbial Transformations of Human Bile Acids'. Microbiome, vol. 9, no. 1, Springer Science and Business Media LLC, 14 June 2021. Crossref, doi:10.1186/s40168-021-01101-1.

16   Molinaro, Antonio, et al. 'Imidazole Propionate Is Increased in Diabetes and Associated with Dietary Patterns and Altered Microbial Ecology'. Nature Communications, vol. 11, no. 1, Springer Science and Business Media LLC, 18 Nov. 2020. Crossref, doi:10.1038/s41467-020-19589-w.

17   Shandilya, Shruti, et al. 'Interplay of Gut Microbiota and Oxidative Stress: Perspective on Neurodegeneration and Neuroprotection'. Journal of Advanced Research, vol. 38, Elsevier BV, May 2022, pp. 223–244. Crossref, doi:10.1016/j.jare.2021.09.005.

18   Sugihara, Kohei et al. "The Role of Dietary Nutrients in Inflammatory Bowel Disease." Frontiers in immunology vol. 9 3183. 15 Jan. 2019, doi:10.3389/fimmu.2018.03183

19   Uyanga, Victoria Anthony et al. "Potential Implications of Citrulline and Quercetin on Gut Functioning of Monogastric Animals and Humans: A Comprehensive Review." Nutrients vol. 13,11 3782. 25 Oct. 2021, doi:10.3390/nu13113782

20   van de Wouw, Marcel et al. "Short-chain fatty acids: microbial metabolites that alleviate stress-induced brain-gut axis alterations." The Journal of physiology vol. 596,20 (2018): 4923-4944. doi:10.1113/JP276431

21   Coker, Joanna K., et al. 'Carbohydrates Great and Small, from Dietary Fiber to Sialic Acids: How Glycans Influence the Gut Microbiome and Affect Human Health'. Gut Microbes, vol. 13, no. 1, Informa UK Limited, 1 Jan. 2021. Crossref, doi:10.1080/19490976.2020.1869502.

22   Zhao, Jianfei, et al. 'Dietary Protein and Gut Microbiota Composition and Function'. Current Protein & Peptide Science, vol. 20, no. 2, Bentham Science Publishers Ltd., 28 Nov. 2018, pp. 145–154. Crossref, doi:10.2174/1389203719666180514145437.

23   Schoeler, Marc, and Robert Caesar. 'Dietary Lipids, Gut Microbiota and Lipid Metabolism'. Reviews in Endocrine and Metabolic Disorders, vol. 20, no. 4, Springer Science and Business Media LLC, 9 Nov. 2019, pp. 461–472. Crossref, doi:10.1007/s11154-019-09512-0.

References

24 Cronin, Peter et al. "Dietary Fibre Modulates the Gut Microbiota." Nutrients vol. 13,5 1655. 13 May. 2021, doi:10.3390/nu13051655

25 Gojda, Jan, and Monika Cahova. "Gut Microbiota as the Link between Elevated BCAA Serum Levels and Insulin Resistance." Biomolecules vol. 11,10 1414. 28 Sep. 2021, doi:10.3390/biom11101414

26 Hossain, Khandkar Shaharina, et al. 'B Vitamins and Their Roles in Gut Health'. Microorganisms, vol. 10, no. 6, MDPI AG, 7 June 2022, p. 1168. Crossref, doi:10.3390/microorganisms10061168.

27 Ellis, Jessie L et al. "Dietary vitamin K is remodeled by gut microbiota and influences community composition." Gut microbes vol. 13,1 (2021): 1-16. doi:10.1080/19490976.2021.1887721

28 Singh, Balwinder, et al. "Bioactive compounds in banana and their associated health benefits–A review." Food chemistry 206 (2016): 1-11.

29 Parvez, G. M., et al. "A short review on a nutritional fruit: guava." Open Access: Toxicology and Research 1 (2018): 1-8.

30 Chaurasia, Savita. "Green beans." Nutritional composition and antioxidant properties of fruits and vegetables. Academic Press, 2020. 289-300.

31 Nakamura, Kozo, et al. "Characterization of bioactive agents in five types of marketed sprouts and comparison of their antihypertensive, antihyperlipidemic, and antidiabetic effects in fructose-loaded SHRs." Journal of food science and technology 53 (2016): 581-590.

32 Richardson, David P., Juliet Ansell, and Lynley N. Drummond. "The nutritional and health attributes of kiwifruit: A review." European journal of nutrition 57 (2018): 2659-2676.

33 Sánchez-Pérez, Sònia et al. "Intestinal Dysbiosis in Patients with Histamine Intolerance." Nutrients vol. 14,9 1774. 23 Apr. 2022, doi:10.3390/nu14091774

34 Gao, Song et al. "The role of gut microbial β-glucuronidase in drug disposition and development." Drug discovery today vol. 27,10 (2022): 103316. doi:10.1016/j.drudis.2022.07.001

35 Kho, Zhi Y., and Sunil K. Lal. 'The Human Gut Microbiome – A Potential Controller of Wellness and Disease'. Frontiers in Microbiology, vol. 9, Frontiers Media SA, 14 Aug. 2018. Crossref, doi:10.3389/fmicb.2018.01835.

36 Celis, Arianna I., et al. 'The Impact of Iron and Heme Availability on the Healthy Human Gut Microbiome in Vivo and in Vitro'. Cell Chemical Biology, vol. 30, no. 1, Elsevier BV, Jan. 2023, pp. 110-126.e3. Crossref, doi:10.1016/j.chembiol.2022.12.001.

Note: This microbiome test is a non-diagnostic evaluation, and intended to be a wellness and lifestyle assessment.