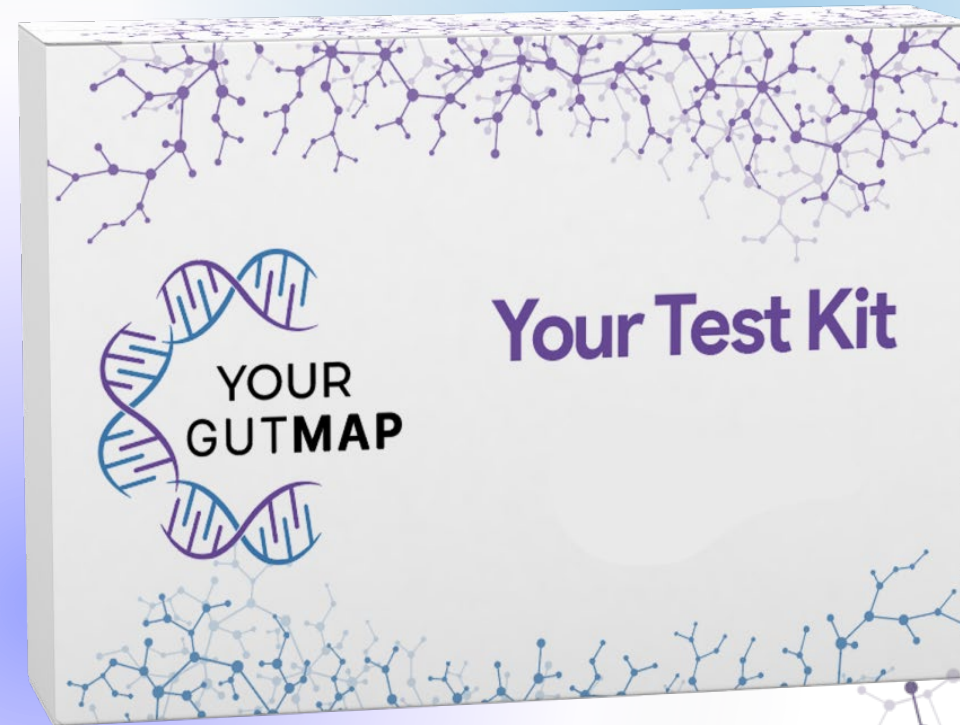


# Gut Microbiome & Longevity



# The Gut Microbiome

## The Key to Longevity, Anti-Ageing, and Optimal Health?



Today's Webinar will examine the role of the gut microbiome in:

Inflammation & Oxidative Stress

Anti inflammatory pathways, TMO & TMAO

Immune Function & Metabolic Health

Weight Management & Obesity

Serotonin & Sleep

Biological Age & Calendar Age

A natural solution to rebalance the gut microbiome?

# The Gut Microbiome

## The Key to Longevity, Anti-Ageing, and Optimal Health?



In recent years, research has shown that the gut microbiome plays an important role in human health and longevity, influencing everything from digestion, body composition, sleep and mood.

One of the most exciting discoveries in recent studies is the profound connection between the gut microbiome and longevity.

Researchers are uncovering that a healthy gut not only supports disease prevention but also plays a significant role in slowing the ageing process.

Today's Webinar will examine how gut microbiome imbalances can have a negative impact on longevity, and perhaps more importantly - how remodulating the gut microbiome can be a strategy for anti-aging, disease prevention, and overall health optimisation.

# The Gut Microbiome and Longevity



The idea that the gut microbiome could influence lifespan might seem surprising, but mounting research supports this connection.

A healthy and balanced microbiome is associated with reduced chronic inflammation, better metabolic health, and improved immune function, all important factors in promoting longevity.

## Longevity

(lon·gev·i·ty)

the capability to survive beyond the species-specific average age of death



# Reducing Inflammation and Oxidative Stress

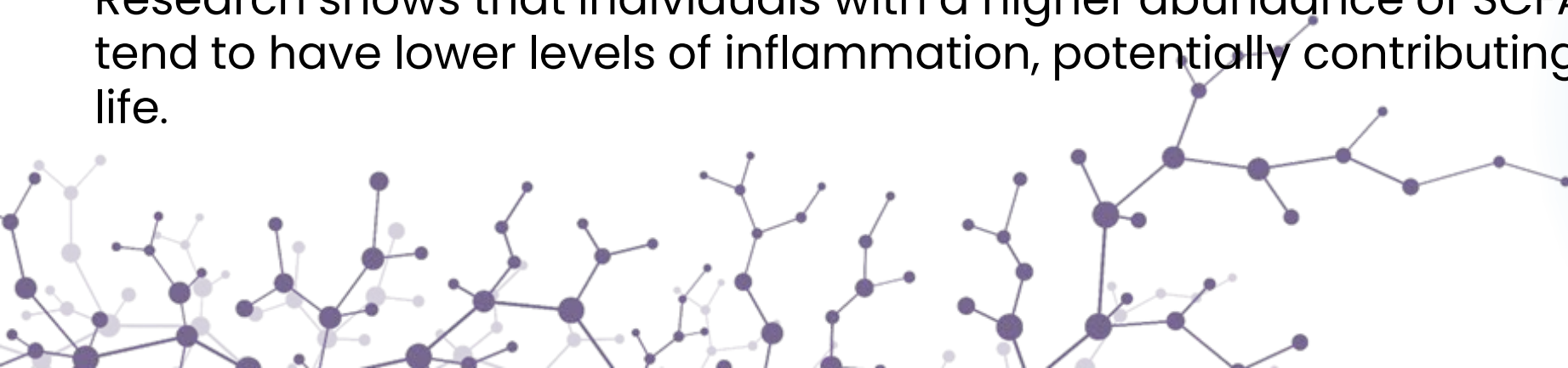


It is now well known, and demonstrated in the literature, that inflammation and oxidative stress are two primary drivers of ageing.

Chronic inflammation, and low-grade chronic inflammation is linked to various age-related diseases, including heart disease, diabetes, and Alzheimer's.

The gut microbiome plays a crucial role in controlling inflammation by producing short-chain fatty acids (SCFAs) like butyrate, which have anti-inflammatory properties.

Research shows that individuals with a higher abundance of SCFA-producing bacteria tend to have lower levels of inflammation, potentially contributing to a longer, healthier life.



## Anti-inflammatory Activity

Butyric Acid Biosynthesis	Faecalibacterium [81]	Low
	Roseburia [83]	Low
	Eubacterium [80]	Normal
	Butyricicoccus [77]	Normal
	Anaerostipes [76]	Normal
	Odoribacter [82]	High
	Butyrivibrio [78]	Normal
	Coprococcus [79]	High
Polyamine Biosynthesis	Bifidobacterium [84]	Normal
Propionate Biosynthesis	Veillonella	Normal
	Akkermansia muciniphila [85]	High
	Bacteroides uniformis [86]	High
	Coprococcus catus [87]	Normal
	Dialister [88]	Normal
	Phascolarctobacterium [89]	Low
	Prevotella copri [90]	Normal
	Roseburia [91]	Low



# Trimethylamine (TMA) & trimethylamine-N-oxide (TMAO)

Trimethylamine (TMA) is a compound produced in the gut when certain bacteria metabolise dietary nutrients like choline and carnitine, which are found in foods such as red meat, eggs, and dairy products.


Once absorbed into the bloodstream, TMA is converted by the liver into trimethylamine-N-oxide (TMAO), a molecule that has been linked to an increased risk of heart disease. Elevated levels of TMAO are associated with the promotion of cholesterol deposition in arterial walls, heightened inflammation, and impaired cholesterol metabolism.

The gut microbiome plays a crucial role in regulating TMA production, as the composition of gut bacteria determines the extent to which TMA is produced.

Research shows that with a well balanced and health gut microbiome, it is possible to reduce TMAO levels, which some early research shows could reduce risk of heart disease - which is the leading cause of death globally.

Wang, Z., et al. (2011). "Gut flora metabolism of phosphatidylcholine promotes cardiovascular disease." *Nature*, 472(7341), 57-63. doi:10.1038/nature09922

Tang, W. H., et al. (2013). "Intestinal microbial metabolism of phosphatidylcholine and cardiovascular risk." *New England Journal of Medicine*, 368(17), 1575-1584. doi:10.1056/NEJMoa1109400



## Trimethylamine (TMA) Conversion

Positively Associated

Acinetobacter  Normal

Aeromonas  Normal

Alcaligenes  Normal

Alteromonas  Normal

Anaerococcus  Normal

Bacillus  Normal

Burkholderia  Normal

Clostridium  Normal

Desulfitobacter  Normal

Desulfovibrio  Normal

Enterococcus  Normal

Eubacterium  Normal

Flavobacterium  Normal

Lactobacillus  Normal

Micrococcus  Normal

Mobiluncus  Normal

Photobacterium  Normal





# Enhancing Immune Function



A robust immune system is essential for longevity, as it protects the body from infections and diseases.

The gut microbiome is deeply intertwined with the immune system, influencing its development and response to pathogens. A balanced microbiome can help maintain immune homeostasis, reducing the risk of autoimmune diseases and infections that become more common with age.



## Autoimmune Index

This score demonstrates the bacterial groups associated with autoimmune diseases and offers an insight into a possibility to experience these diseases.

A high score could indicate that you'd be prone to autoimmunity, however, is not meant to be used for diagnostic purposes.



# Metabolic Health

Metabolic health is another crucial factor in ageing. Dysbiosis, or an imbalance in the gut microbiome, is linked to metabolic disorders like obesity, insulin resistance, and type 2 diabetes.

By promoting a healthy gut microbiome, you can improve metabolic health, which is vital for maintaining energy levels, preventing chronic diseases, and promoting longevity.

Type 2 Diabetes		
Positively Associated	Rothia [65]	Normal
Negatively Associated	Lactobacillus [67, 68]	Normal
	Roseburia [64, 69]	Low
	Victivallis [70]	Normal
	Akkermansia muciniphila [64]	High

# Weight Management & Obesity



The gut microbiome plays a significant role in the development and regulation of obesity by influencing energy usage, fat storage, and inflammation.

Research has shown that individuals with obesity often have a less diverse gut microbiome, with an increased ratio of Firmicutes to Bacteroidetes, which is associated with enhanced energy extraction from food and fat deposition.

Additionally, gut bacteria can affect host metabolism by modulating levels of short-chain fatty acids (SCFAs) and altering gut-brain signaling pathways that regulate appetite and satiety.

Dysbiosis, or an imbalance in the gut microbiome, can also lead to chronic low-grade inflammation, contributing to insulin resistance and further promoting obesity. This intricate relationship highlights the potential for targeting the gut microbiome in obesity prevention and treatment strategies.

Turnbaugh, P. J., et al. (2006). "An obesity-associated gut microbiome with increased capacity for energy harvest." *Nature*, 444(7122), 1027-1031. doi:10.1038/nature05414

# Metabolic Score

This score shows the tendency of an individual to lose or gain weight.

A high score indicates that you have a microbiome profile that is prone to weight gain, while a low score indicates that you are prone to maintain your ideal body weight and are more easily able to stay fit.



## Obesity

Positively Associated	Acidaminococcus [53]	High
Negatively Associated	Akkermansia muciniphila [55]	High
	Christensenella [61]	Normal
	Alistipes [56]	Low
	Anaerotruncus [57]	Normal
	Butyrivibrio [59, 60]	Normal
	Methanobrevibacter [52]	Normal
	Bifidobacterium [58]	Normal
	Papillibacter [63]	Normal
	Microbiome Diversity [59, 60, 62]	High

# Gut Health and Anti-Aging



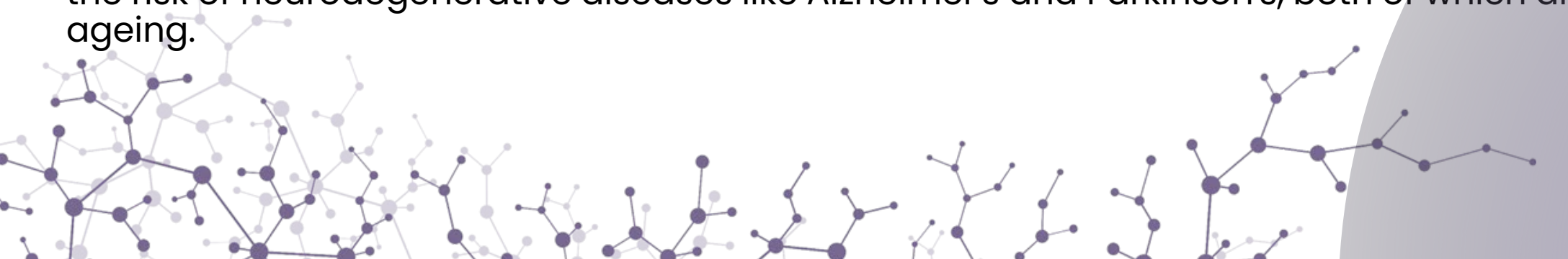
Beyond potentially extending lifespan, a healthy gut microbiome is also associated with various anti-aging benefits. Here's how:

## **Skin Health**

The gut-skin axis is a well-documented phenomenon, where gut health directly impacts skin health. A balanced microbiome can reduce skin inflammation, prevent acne, and slow down the formation of wrinkles by combating oxidative stress. Some studies even suggest that certain healthy bacteria can enhance skin hydration and elasticity.

## **Brain Health and Cognitive Function**

The gut-brain axis is another critical pathway through which the microbiome influences ageing. A healthy gut microbiome produces neurotransmitters like serotonin, which regulate mood and cognitive function. Studies have shown that maintaining a diverse gut microbiome can reduce the risk of neurodegenerative diseases like Alzheimer's and Parkinson's, both of which are linked to ageing.



# More on Serotonin



Serotonin and melatonin are closely linked in regulating sleep, as serotonin is a precursor to melatonin, the hormone that controls sleep-wake cycles.

More than 90% of Serotonin is produced in the gut, and it plays a critical role in mood regulation, but it is also crucial for the synthesis of melatonin in the pineal gland.

As evening approaches and light levels decrease, serotonin is converted into melatonin, which signals the body to prepare for sleep by inducing drowsiness and lowering body temperature.

Disruptions in serotonin levels, often influenced by factors such as stress, diet, or gut health, can lead to inadequate melatonin production, resulting in sleep disorders like insomnia. This relationship highlights the importance of maintaining balanced serotonin levels for healthy sleep patterns.

# Sleep & Longevity



Several studies have shown sleep disruption to have a negative affect on longevity, quality of life, and disease.

One interesting example is that many studies for example have shown that you are more likely to die of a heart attack:

24% higher instance of heart attacks on the Monday after daylight savings

8% higher instance of heart attacks throughout the subsequent week

# Sleep & Longevity



Bone density and muscle mass correlate with living longer. Several studies show the relationship between greater levels of muscle mass and LBM realise a reduced rate of mortality in older age.

What does this have to do with sleep?

One interesting study followed subjects utilising hypertrophy-based training regiment. The study split subjects into two groups, following the same training program and diet (with a 10% calorific deficit). The only variable was the amount of sleep...

Group 1 slept for 8–9 hours – Group 2 slept for 6–7 hours.

Each group lost the same amount of weight, however group 1 maintained LBMI, whilst Group 2 disproportionately lost muscle and maintained the level of fat.

Reilly, T., & Piercy, M. (1994). "The effect of partial sleep deprivation on weight-lifting performance." *Ergonomics*, 37(1), 107-115. doi:10.1080/00140139408963628



# Even more on Serotonin

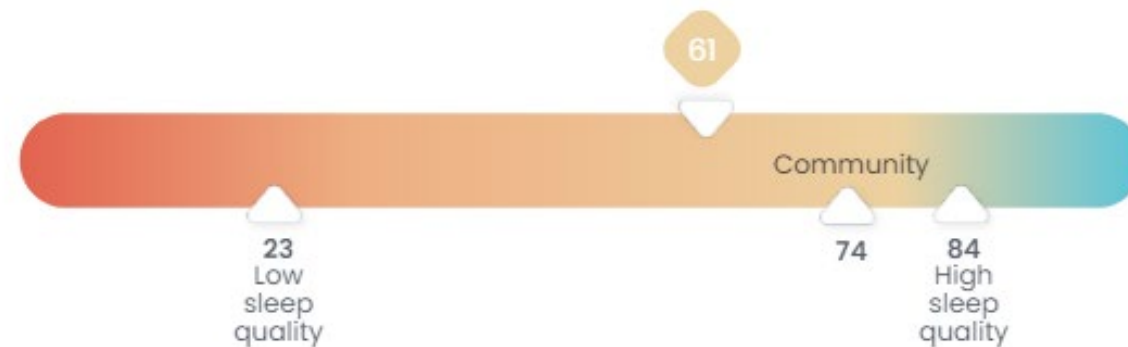
Sleep is crucial for longevity because it supports essential bodily functions such as cellular repair, immune system regulation, and cognitive health, reducing the risk of chronic diseases and promoting overall well-being



## Sleep Quality

This score indicates the potential/tendency of microbiome to promote quality sleep.

Your score is compared with scores of individuals with high quality sleep and those suffering from sleep disorders/low sleep quality.



# Definitely the last slide on Serotonin...

## Bacterial Neurotransmitters

Serotonin Biosynthesis

Streptococcus

Low

Enterococcus

Normal

Gamma Aminobutyric Acid  
(GABA) Biosynthesis

Lactobacillus

Normal

Bifidobacterium

Normal

# Disease Prevention & Gut Health



The gut microbiome is also a key player in disease prevention, offering protection against a range of conditions that typically arise with ageing:

## Cardiovascular Health

Cardiovascular diseases are a leading cause of death worldwide, especially in older adults. Emerging research suggests that a healthy gut microbiome can reduce the risk of heart disease by influencing factors like cholesterol levels, blood pressure, and inflammation.

## Cancer Prevention

Certain gut bacteria are involved in the metabolism of dietary fibers into SCFAs, which have been shown to protect against colorectal cancer. Additionally, a balanced microbiome can enhance the effectiveness of the immune system, helping to detect and eliminate cancer cells before they develop into full-blown tumours.


## Diabetes Management

Type 2 diabetes is closely linked to gut health. Dysbiosis can lead to insulin resistance, a hallmark of diabetes. By promoting a healthy gut microbiome through diet and lifestyle changes, you can improve insulin sensitivity and reduce the risk of developing diabetes as you age.

Zhou, B., et al. (2020). "The microbiota and microbiome in pancreatic cancer: More influential than expected." *Molecular Cancer*, 19(1), 48. doi:10.1186/s12943-020-01167-2

Yu, T., & Zheng, H. (2021). "The gut microbiome in colorectal cancer: from association to contribution." *Clinical Microbiology and Infection*, 27(4), 512-520. doi:10.1016/j.cmi.2020.08.033

Schwabe, R. F., & Jobin, C. (2013). "The microbiome and cancer." *Nature Reviews Cancer*, 13(11), 800-812. doi:10.1038/nrc3610



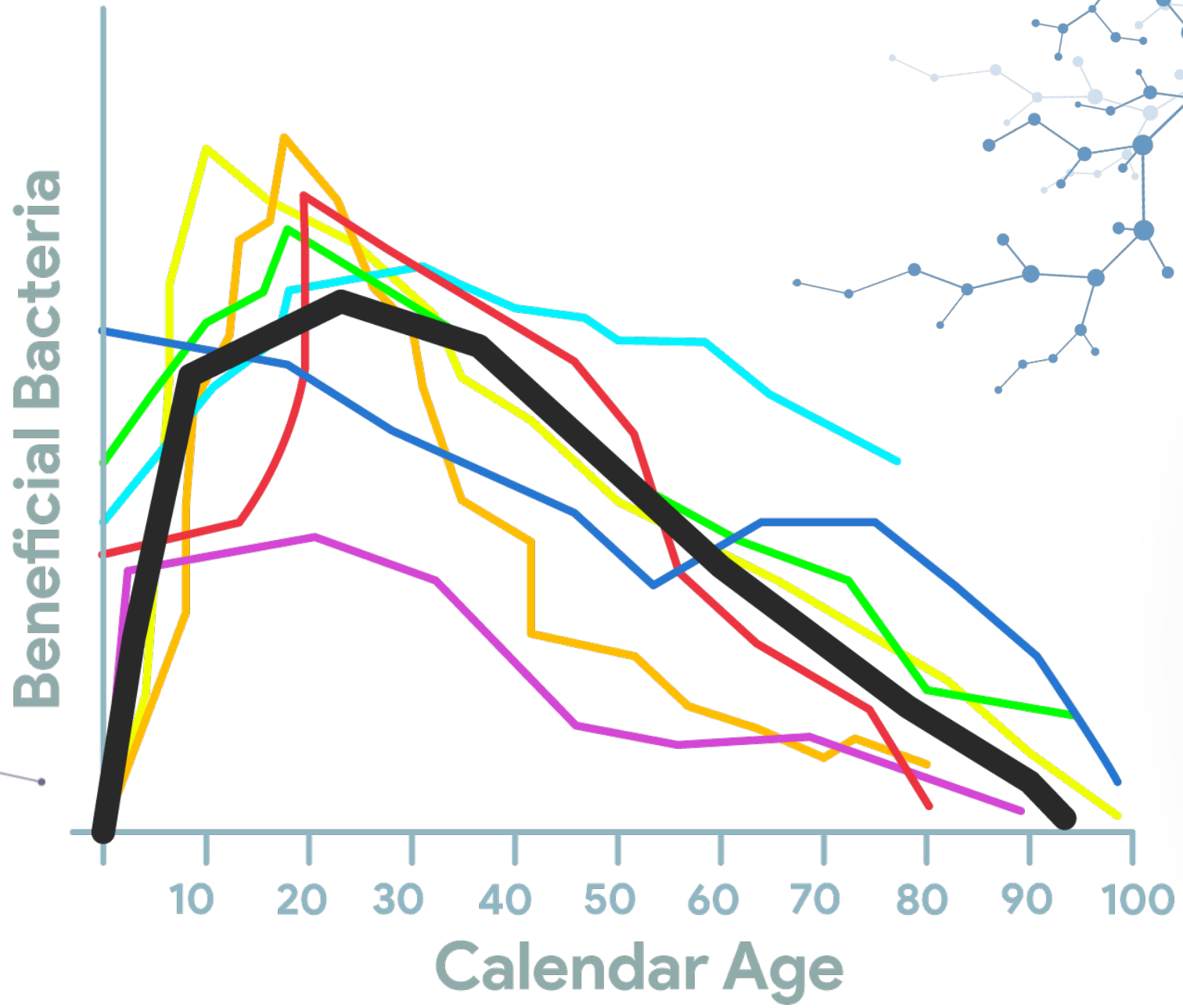


# Biological Age versus Calendar Age

Several beneficial bacteria have a typical life cycle that follows our calendar age. These bacteria will typically reach their peak at ages 15-18 as the gut microbiome fully develops.

However, they will decline as we age. By examining these trends, and using our bioinformatics database, we are able to plot where you should be in the aging cycle, compared to your stool sample result.

Unfortunately, modern diets and lifestyles mean our microbiome is aging faster than us in most cases.





# Biological Age versus Calendar Age

## Your Microbiome Age

55

*It appears your microbiome is aging faster than you. However, with the personalized nutrition plan we've put together for you, you've begun your journey toward rejuvenating your microbiome and improving your health!.*

Unfortunately, the average result from our stool testing is 7 years older than the calendar age – however the good news is after ~3 months we can see a tangible decrease by following our unique protocol to naturally rebalance the microbiome through personalized dietary changes

## Client Report

Microbiome Diversity

Microbiome Age

Important Bacteria (9 bacteria)

Metabolic Score

Carbohydrate Metabolism

Protein Metabolism

Fat Metabolism

Vitamin & Mineral Synthesis

Lactose Sensitivity

Gluten Sensitivity

Sugar Index

Processed Food / Artificial Sweetener Index

Bowel Mobility

Antibiotic Damage

Autoimmune Index

Sleep Quality

Health Condition Index (23 Conditions & Diseases)

Personal Nutrition Guide (300 Foods & Drinks)

## Discover increased risk of health problems from the microbiome:

- Skin related disorders
- SIBO
- Fungal overgrowths
- Autism spectrum disorders
- Lactose intolerance
- Migraine
- Food allergy
- Respiratory disorders
- Attention disorders
- IBS
- Constipation
- Diarrhea
- Autoimmune disorders
- Gluten Reactions
- IBD
- Heart related disorders
- Thyroid related disorders
- Non-food allergies
- Liver disorders
- Obesity
- Blood sugar disorders
- Kidney related disorders
- Phenylketonuria

## Practitioner Report

Diarrhea

Constipation

Gas

Bloating

Irritable Bowel Syndrome

Inflammatory Bowel Disease

Crohn's Disease

Ulcerative Colitis

Obesity

Type 2 Diabetes

Coronary Heart Disease

Kidney Stone

Anti-inflammatory Activity

Butyric Acid Biosynthesis

Polyamine Biosynthesis

Propionate Biosynthesis

Trimethylamine (TMA) Conversion

Serotonin Biosynthesis

Gamma Aminobutyric Acid (GABA) Biosynthesis



# Optimising Gut Microbiome for Longevity

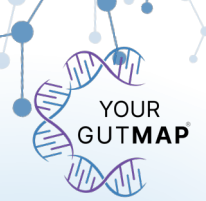


Fortunately, we have created a 21<sup>st</sup> century solution, for a 21<sup>st</sup> century problem.

Once we unlock health insights and discover disease risk factors from the gut microbiome, our unique dietary planning is clinically proven in studies to naturally rebalance the gut microbiome.



# Personal Diet Guide











Now we know the problems, what are the solutions?

Each test report includes a scoring system of over 300 foods and drinks.

This completely unique protocol starves the bacteria we need less of and feeds the bacteria we need more of.

**A natural solution to rebalance the microbiome.**

	Beef	
	Pork	
	Chicken	
	Lamb	

# Published Studies

Average improvement in microbiome diversity of 18% across three published studies:

82% success in improving IBS symptoms

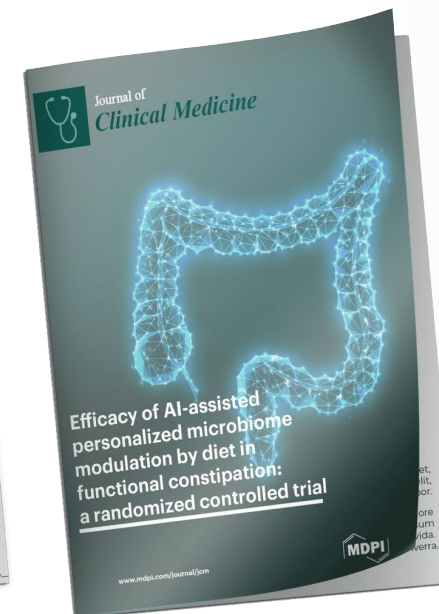
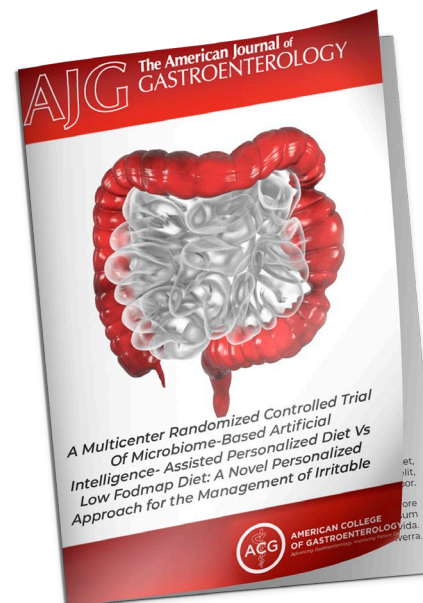
85% success in improving constipation symptoms

More effective, and less restrictive than low FODMAP

64% increase in energy levels

42% improvement in sleep quality

4x reduction in IBS-SSS



# Concluding Summary



Longevity is a multi factorial issue – encompassing many focus areas around, diet, lifestyle, genetics, and many other factors.

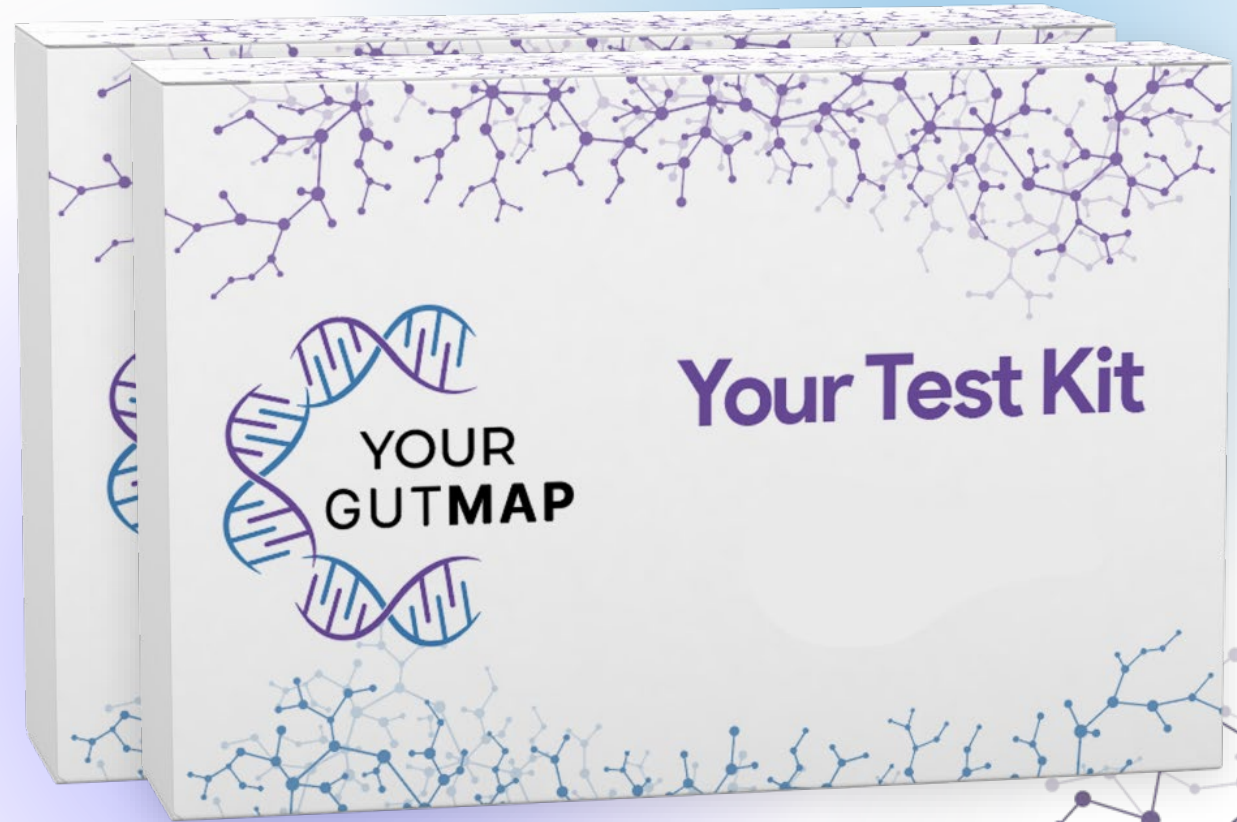
However, there is a growing research base showing that the gut microbiome should be a prominent consideration in the topic.

Taking a gut microbiome test can unlock key health insights, and identify disease risk factors. Perhaps more importantly, a test through YourGutMap generates a completely personalised dietary plan to naturally rebalance the microbiome.

In a world where we treat our gut microbiome so poorly (processed foods, artificial sweeteners, seed oils, medications, pollution, etc) – people interested in longevity and health optimization should (in our opinion) consider their gut microbiome as a key factor in the topic.

# Microbiome & Longevity

Follow your  
unique GutMap





# References



Wang, Z., et al. (2011). "Gut flora metabolism of phosphatidylcholine promotes cardiovascular disease." *Nature*, 472(7341), 57-63. doi:10.1038/nature09922

Tang, W. H., et al. (2013). "Intestinal microbial metabolism of phosphatidylcholine and cardiovascular risk." *New England Journal of Medicine*, 368(17), 1575-1584. doi:10.1056/NEJMoa1109400

Qin, J., et al. (2012). "A metagenome-wide association study of gut microbiota in type 2 diabetes." *Nature*, 490(7418), 55-60. doi:10.1038/nature11450

Turnbaugh, P. J., et al. (2006). "An obesity-associated gut microbiome with increased capacity for energy harvest." *Nature*, 444(7122), 1027-1031. doi:10.1038/nature05414

Cajochen, C., et al. (2003). "Role of melatonin in the regulation of human circadian rhythms and sleep." *Journal of Neuroendocrinology*, 15(4), 432-437. doi:10.1046/j.1365-2826.2003.00989.x

Sandhu, A., Seth, M., & Gurm, H. S. (2014). "Daylight savings time and myocardial infarction." *Open Heart*, 1(1), e000019. doi:10.1136/openhrt-2013-000019

Reilly, T., & Piercy, M. (1994). "The effect of partial sleep deprivation on weight-lifting performance." *Ergonomics*, 37(1), 107-115. doi:10.1080/00140139408963628

Irwin, M. R. (2015). "Why sleep is important for health: a psychoneuroimmunology perspective." *Annual Review of Psychology*, 66, 143-172. doi:10.1146/annurev-psych-010213-115205

Zhou, B., et al. (2020). "The microbiota and microbiome in pancreatic cancer: More influential than expected." *Molecular Cancer*, 19(1), 48. doi:10.1186/s12943-020-01167-2

Yu, T., & Zheng, H. (2021). "The gut microbiome in colorectal cancer: from association to contribution." *Clinical Microbiology and Infection*, 27(4), 512-520. doi:10.1016/j.cmi.2020.08.033

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Cajochen, C., et al. (2003). "Role of melatonin in the regulation of human circadian rhythms and sleep." *Journal of Neuroendocrinology*, 15(4), 432-437. doi:10.1046/j.1365-2826.2003.00989.x