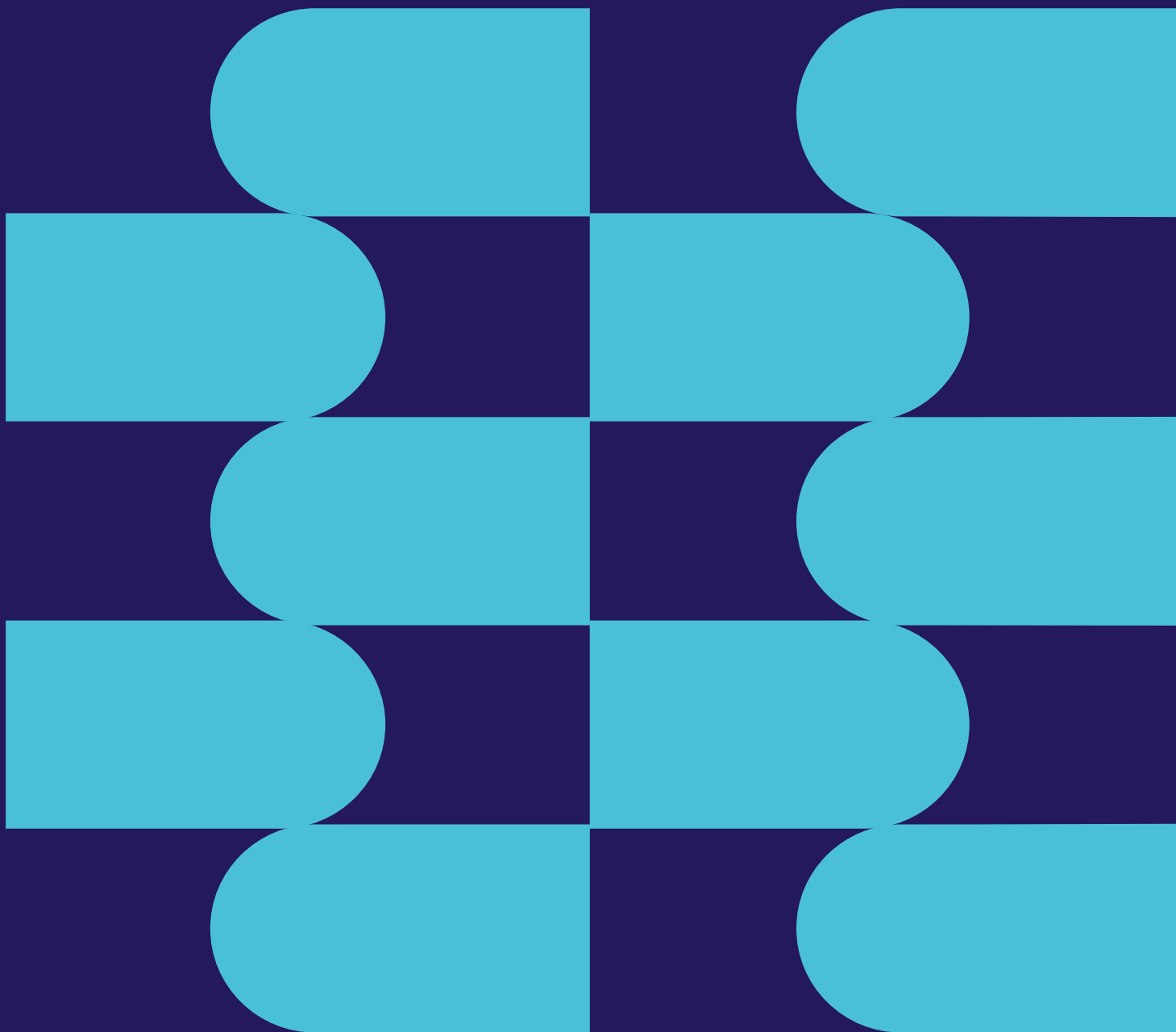


Probiotics+ Metabolic Health



The widest range of benefits

Probiotics+ Metabolic Health

Contents

- 03** Metabolic Health
- 04** The Evidence for Lab4P Effectiveness for Supporting Metabolic Health
- 04** The Promagen Study
- 06** The Probe Study
- 07** Proposed Mechanisms of Action of Lab4P
- 08** Lab4 - A Multitude of Benefits
- 09** References



Metabolic Health

Metabolic health has become a priority throughout the world over the past decade as the number of people suffering from metabolism-related conditions has increased.

Metabolic disorders are conditions that occur when the body's chemical reactions that convert food into energy are not functioning normally. They include diabetes, obesity, atherosclerosis, and mitochondrial disorders. Metabolic syndrome is a cluster of conditions that together have been shown to increase susceptibility to these diseases and include increased blood pressure, high blood sugar, excess body fat around the waist and abnormal cholesterol.

Globally around 25% of adults have metabolic syndrome and these figures increase depending on location – it is up to a third in the USA and global figures now indicate that 3% of children and 5% of adolescents have metabolic syndrome.

Probiotics and Metabolic Health

Recent research into the gut microbiome has revealed promising strategies for managing metabolic syndrome and related conditions, indicating that an imbalance in the gut microbiome (known as dysbiosis) affects fat storage, energy metabolism and glucose regulation, all of which are involved in metabolic health.

- 2 published randomised placebo-controlled clinical studies showing clear benefits for metabolic health
- First large study with 220 obese and overweight adults
- Second follow-up study with 70 overweight adults aged 45-65 years
- Lab4P Probiotics has shown a significant impact in reducing weight, waist circumference and cholesterol in overweight and obese individuals

Microbiologists Dr. Nigel Plummer and Dr. Sue Plummer established Cultech Ltd in 1994 with the vision for a company with research at its heart.



Studies

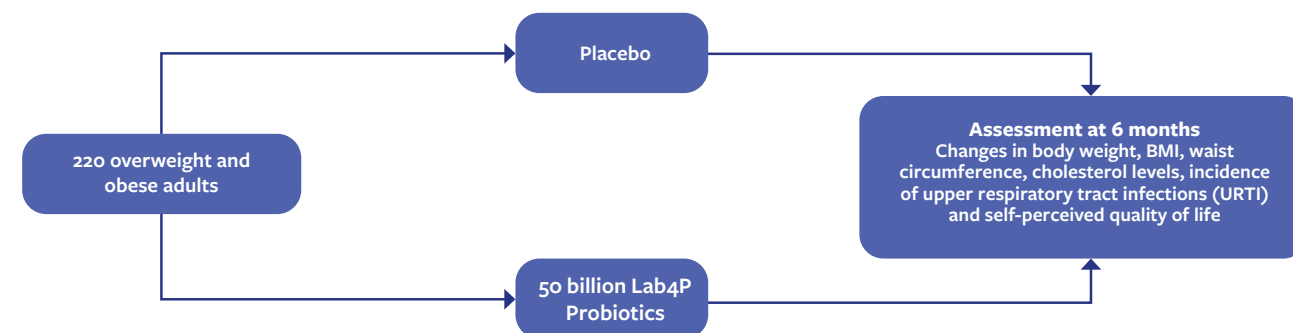
The Evidence for Lab4P Effectiveness for Supporting Metabolic Health

The Lab4P Probiotics consortium is a combination of Lab4 Probiotics and a specific strain of *Lactobacillus plantarum*. It entrains all the benefits of the Lab4 Probiotics consortium and is a unique blend of five strains shown to provide clinical benefits in relation to several metabolic health markers.

The Promagen Study

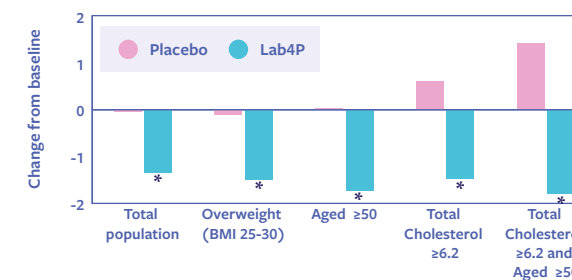
The first clinical study using the Lab4P Probiotics blend to study its metabolic effects was done in conjunction with Imperial College, London.

This exploratory, randomised, double-blind, placebo-controlled study with 220 overweight and obese adults with BMI 25-34.9, aimed to assess the effect of 6-months' supplementation of Lab4P on body weight and wellbeing in healthy overweight and obese individuals.



Results

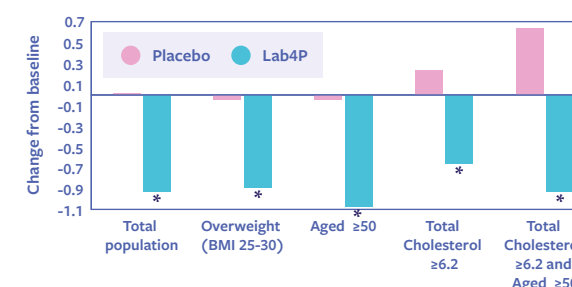
Body Weight (Kg)



Lab4P Probiotics supplementation resulted in significant weight loss compared to placebo:

- 1.3kg (2.9lb) in the total population (* $P < 0.0001$)
- 1.4kg (3.1lb) in overweight participants (* $P < 0.0001$)
- 1.75kg (4lb) in over 50 year olds (* $P < 0.001$)
- 2.1kg (4.6lb) in hypercholesterolaemic participants (* $P < 0.0001$)
- 3.2kg (7.1lb) in hypercholesterolaemic participants over 50 years old (* $P < 0.0001$)

Waist Circumference



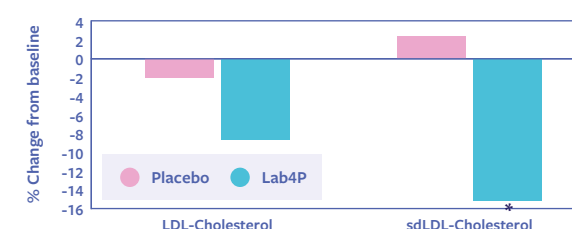
There were also significant reductions in waist circumference in the Lab4P Probiotics group compared to placebo:

- 0.94cm (0.37in) in the total population (* $P < 0.0001$)
- 0.85cm (0.34in) in overweight participants (* $P = 0.002$)
- 1.03cm (0.41in) in over 50-year-olds (* $P < 0.001$)
- 0.90cm (0.35in) in hypercholesterolaemic participants (* $P = 0.027$)
- 1.57cm (0.62in) in hypercholesterolaemic participants over 50 years old (* $P = 0.0028$)

Significant reductions in BMI and waist-to-height ratio were also observed in each of the above populations.

Greater rates of weight loss were observed in the overweight compared to the obese participants (1.9% vs 1.2% reduction) and in women compared to men (1.6% vs 1.4% reduction).

Hypercholesterolaemic participants (TC >6.2 mmol/l)



In hypercholesterolaemic participants taking the Lab4P Probiotics compared with those taking placebo:

- There was a significant reduction (17.6%) in the plasma levels of atherogenic small dense LDL-cholesterol (sdLDL-C) (* $P < 0.05$).
- Plasma LDL-C levels were reduced by 6.6%.

Conclusion

Supplementation of overweight and obese adults with the Lab4P Probiotic for six months resulted in a significant reduction in body weight in the participants with no lifestyle restrictions. In hypercholesterolaemic overweight and obese subjects, there was a significant reduction in the levels of highly atherogenic small dense LDL.

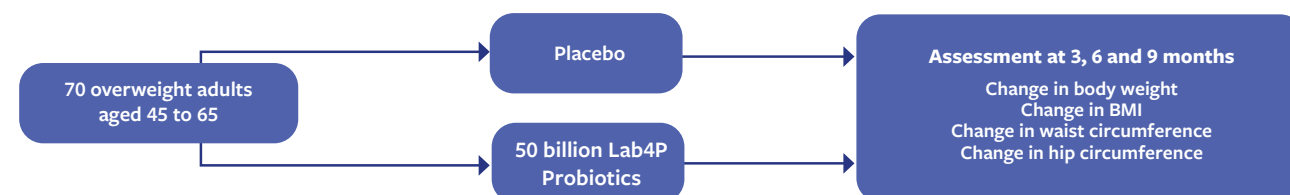


Scan for more info

The Probe Study

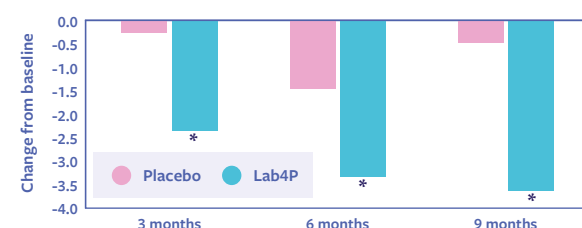
The second follow-up study investigated the impact of the Lab4P Probiotics blend on overweight subjects aged 46-65 years. It was undertaken in association with Cardiff University and Imperial College, London.

This randomised, double-blind, placebo-controlled study assessed the effect of 9-months' supplementation with Lab4P Probiotics on body weight in overweight adults with BMI 25-29.9 and no other changes in lifestyle.



Results

Body Weight (kg)



Lab4P Probiotic supplementation resulted in significant weight loss compared to placebo (* $P < 0.001$):

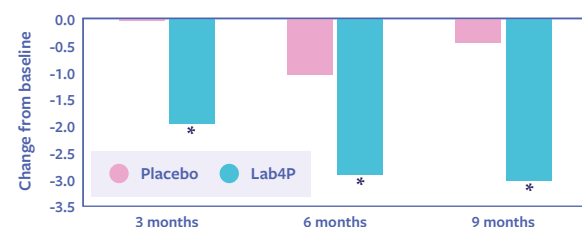
- A difference of -2.11kg at 3 months (2.51% reduction)
- A difference of -1.88kg at 6 months (2.19% reduction)
- A difference of -3.16kg at 9 months (3.76% reduction)

By 9 months, 71% of participants taking Lab4P Probiotics had achieved 3% substantial weight loss compared to 17% in the placebo group.

40% of participants taking Lab4P Probiotics achieved clinically meaningful weight loss (defined as 5% weight loss over a 6-12-month period), compared to 3% of placebo participants.

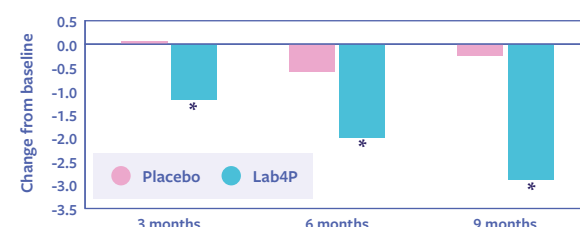
Consistent weight loss was observed even during the indulgent Christmas period (months 6 to 9), whereas the placebo group gained weight during this period.

Waist circumference



- There was a significant reduction in waist circumference at each time point in the Lab4P group compared with the placebo group, with a 2.48% reduction at 9 months (-2.58 cm).

Hip circumference



- Significant changes in hip circumference were found over the study period and supplementation with Lab4P Probiotics resulted in a significant 2.36% reduction compared to placebo at 9 months (-2.66 cm).

Conclusion

Supplementation with Lab4P Probiotics for 9 months resulted in a significant reduction in body weight in the overweight 45 to 65 years old adults without any lifestyle restrictions. Furthermore, 40% of these participants reached the desirable annual 5% weight loss beneficial for health and wellbeing.

The findings of this second study with Lab4P Probiotics support the outcomes of the previous Promagen Study with 220 overweight and obese participants.



Scan for more info

Proposed Mechanisms of Action of Lab4P

In the Gut – Lab4P Probiotic Activity at the Intestinal Level

1. Bile Salt Hydrolase (BSH) Activity

All Lab4 strains and *Lactobacillus plantarum* CUL66 exhibit BSH activity, which is crucial for deconjugating bile acids.

Deconjugation of bile acids by Lab4P Probiotics in the intestinal lumen making them less efficient in emulsifying dietary fat and the formation of micelles necessary for fat absorption.

2. Reduction in Cholesterol Uptake

Probiotics may bind dietary cholesterol directly or alter its solubility, decreasing uptake.

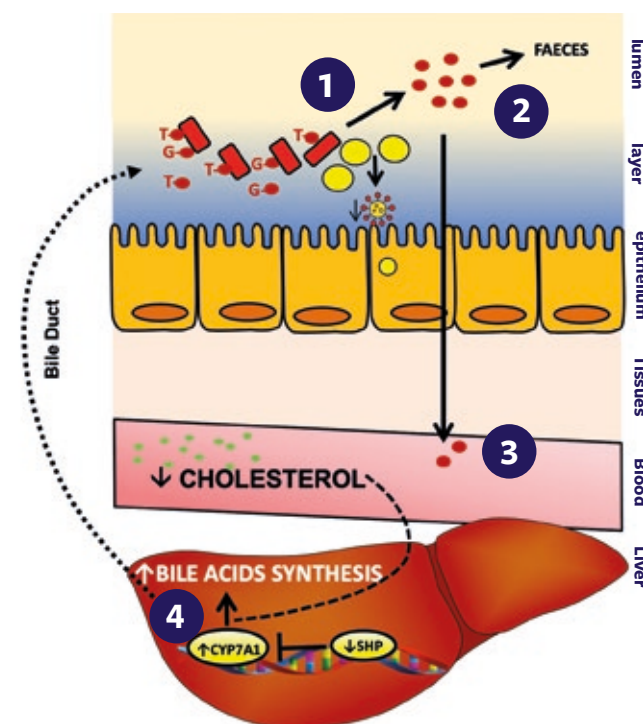
3. Modulation of Cholesterol Transporters

Reduced expression or function of cholesterol transporters such as NPC1L1 (Niemann-Pick C1-like 1), which plays a critical role in intestinal cholesterol absorption.

Overall Effect

Together with increased bile acid excretion and upregulation of hepatic cholesterol metabolism, this dual mechanism explains the reduction in plasma cholesterol and body weight gain.

Proposed Mechanism of Action



Legend

- Cholesterol
- Lab4P
- G,T Conjugated bile acids
- Deconjugated bile acids
- Dietary fat
- Micelle

In the Faeces – Enhanced Excretion

1. Increased Excretion of Deconjugated Bile Acids

Deconjugated bile acids are less efficiently reabsorbed and more likely to be lost in faeces.

2. Increased Cholesterol Excretion

In the Liver – Bile Acids Synthesis Increases

1. Increase of CYP7A1 (Cholesterol 7-hydroxylase)

Enhance conversion of cholesterol to bile acids.

2. Decrease of SHP (Small Heterodimer Partner)

Its reduction supports continued bile acid production.

3. Compensatory Cholesterol Utilisation

To replenish bile acids lost in faeces, the liver utilises more circulating cholesterol to synthesise new bile acids, thereby lowering plasma cholesterol levels.

1. DECONJUGATION OF BILE ACIDS by Lab4P

Probiotics in the intestinal lumen reduces their reabsorption and fat-emulsifying efficiency leading to decreased micelle formation and fat absorption.

2. EXCRETION OF DECONJUGATED BILE ACIDS

is increased in faeces (stool).

3. RE-ABSORPTION OF DECONJUGATED BILE ACIDS

into the blood is reduced.

4. BILE ACIDS SYNTHESIS is increased in the liver (SHP decreases, CYP7A1 increases) to replenish bile acids lost in faeces, resulting in reduced circulating cholesterol levels.



Scan for more info



Scan for more info



Scan for more info



A multitude of benefits

- Lab4 Probiotics has shown simultaneous benefits on digestive health, immune function, athletic performance, gut-brain axis, and alongside antibiotic use
- Lab4P Probiotics has shown benefits in relation to metabolic health, as well as entraining all the benefits identified for the original Lab4 consortium
- The Lab4 consortia are adapted to the human gut with demonstrable ability to survive stomach acidity and bile acids and to colonise epithelial tissue and mucous
- Shelf-life up to 24 months in ambient conditions*

Why Lab4 Probiotics Work

One body system

The gut and hence the microbiome are extensively connected to almost all of the other physiological systems of the body, this includes the immune system, endocrine system, brain and central nervous system, and metabolic physiology.

Proxies for microbes

Consequently, as proxies for our microbiome, effective probiotics could also impact beneficially on these distant physiologies – and these benefits may be manifest simultaneously as the intestinal health benefits outlined above.

Bacterial colonisation

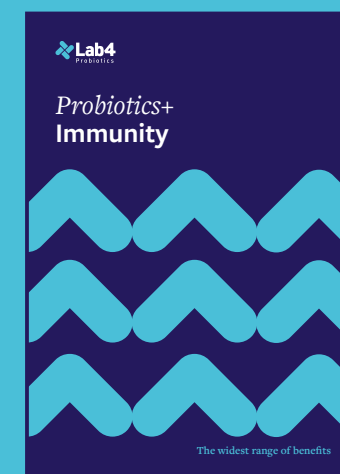
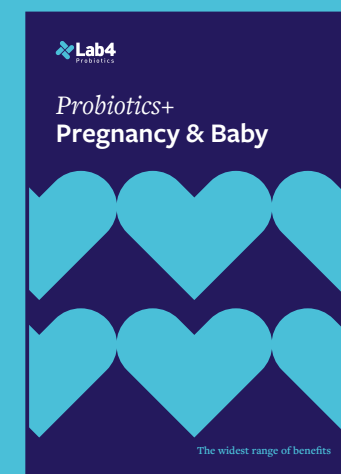
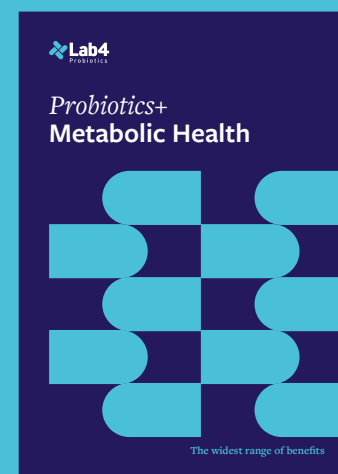
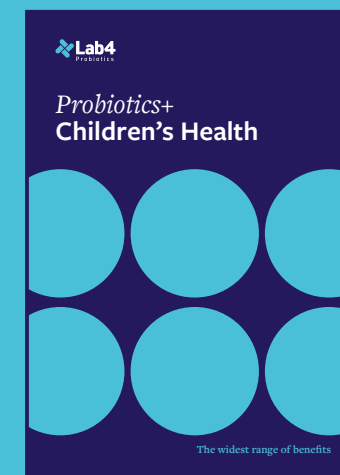
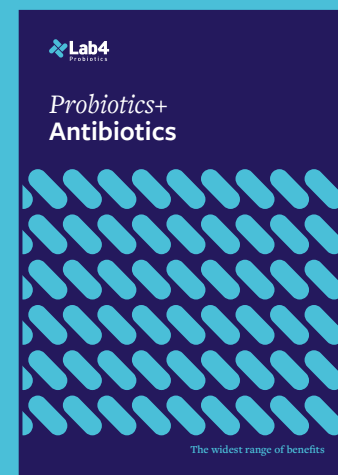
Lab4 contains *Lactobacillus acidophilus* (two strains) as well as *Bifidobacterium animalis* subsp. *lactis* and *Bifidobacterium bifidum*. The Lactobacilli are dominant colonisers of the sparsely populated small intestine and the Bifidobacteria constitute a significant population in the distal small intestine and are also present throughout the large intestine.

High dose

Over the past 30 years it has become evident that higher doses of effective probiotic strains produce faster, greater and more consistent effects and benefits. In all clinical studies on adults performed to date, Lab4 has been supplemented at 25 billion a day. This is why we have seen a broad range of consistent health benefits across a wide range of conditions and particularly with intestinal health.

*In powder and capsule products produced and packed appropriately

See our other Guides



Lab4 Specification

Lab4 Probiotics blends are available as freeze-dried concentrated powders at various concentrations. Please contact us for more details at info@lab4probiotics.co.uk or on 01639 825100
www.lab4probiotics.co.uk

References

- <https://www.ox.ac.uk/news/2023-09-07-poor-metabolic-health-could-increase-risk-developing-dementia-later-life>
<https://www.nhlbi.nih.gov/health/metabolic-syndrome#>
<https://www.ncbi.nlm.nih.gov/books/NBK459248/>
Reddy N et al. 2024. Harnessing the Power of the Gut Microbiome: A Review of Supplementation Therapies for Metabolic Syndrome. Cureus Sep 18;16(9):e69682
Michael DR et al. 2020 A randomised controlled study shows supplementation of overweight and obese adults with lactobacilli and bifidobacteria reduces bodyweight and improves well-being. Scientific Reports 10(1): 4183
Michael DR et al. 2021 Daily supplementation with the Lab4P probiotic consortium induces significant weight loss in overweight adults. Scientific Reports 11, 5.
Michael DR et al. 2016. Lactobacillus plantarum CUL66 can impact cholesterol homeostasis in Caco-2 enterocytes. Benef Microbes Jun;7(3):443-51.
Michael DR et al. 2017. The anti-cholesterolaemic effect of a consortium of probiotics: An acute study in C57BL/6J mice. Sci Rep Jun 6;7(1):2883.
Baker LM et al 2021. A genome guided evaluation of the Lab4 probiotic consortium. Genomics Nov;113(6):4028-4038.



Probiotics+
Metabolic Health

lab4probiotics.co.uk



Scan for more info