



DOSSIER · SUBSTANCE

# Probiotics

The database comprises an extensive collection of works on **Probiotics**, of which about one third are controlled studies in humans. The focus lies on **gut health** and **inflammatory processes**, yet the results depend strongly on **strain**, **dose** and **target group**. The research shows above all how complex the interactions are – and where robust data are lacking.

**4,112**

STUDIES IN  
TOTAL

**1,302**

IN HUMANS

**747**

OF WHICH  
CONTROLLED

**550**

IN ANIMALS

**445**

IN THE LAB

Figures from the IHR study database · Last updated 2026-10-15

## How to Read This Dossier

**ESTABLISHED**

measured in humans, with a comparison group

**PLAUSIBLE**

supported by mechanism, animal studies or observation

**HYPOTHESIS**

a likely connection that still needs to be tested

## Probiotics at a Glance

### ORIGIN:

Probiotics are living microorganisms that, when administered in sufficient quantity, are intended to exert health effects.

### EVIDENCE BASE:

4.112 evaluated studies · 747 controlled human studies · 555 observational studies · 474 review articles · 550 animal studies · 340 cell culture studies

### STRONGEST EVIDENCE:

- **Gut health:** Controlled studies show strain- and dose-dependent effects in irritable bowel syndrome, whereby certain *Lactobacillus* and *Bifidobacterium* strains can alleviate symptoms, yet no uniform results are available.
- **Inflammatory processes:** In dialysis-dependent diabetes patients with coronary heart disease, a twelve-week probiotic supplementation significantly reduced the high-sensitivity CRP value ( $p=0.001$ ), however without specification of the exact CFU dose per strain.
- **Metabolism:** Probiotic supplementation in type-2 diabetes patients showed metabolic effects in randomised studies, for example improved fasting glucose and insulin resistance (HOMA-IR), yet with population-specific limitations.
- **Safety:** Extensive safety studies confirm good tolerability in healthy populations, whereas systemic infections are documented in the immunosuppressed, necessitating a differentiated benefit-risk assessment.
- **Inflammatory markers:** In colorectal carcinoma, a six-month probiotic supplementation indicated a reduction in pro-inflammatory cytokines, however without complete data on effect sizes.

### LIMITATIONS:

- The effect of probiotics is strongly strain-, dose- and target-group-specific, which complicates comparisons between studies and does not permit generalisable statements.
- Systematic long-term studies in healthy populations or over periods exceeding 12 months are still outstanding.
- The transferability of animal or cell-culture studies to humans is limited, as the gut microbiota is species-specific and individually variable.

### CLASSIFICATION:

Probiotics are living microorganisms with strain- and dose-dependent effects on gut health, inflammatory processes and metabolism, whose efficacy has been shown in controlled studies but is limited by individual variability and methodological heterogeneity.

## 1. What Probiotics Are

**Probiotics** are living microorganisms that are intended to exert **health effects** when administered in sufficient quantity. They occur naturally in fermented foods such as yoghurt, kefir or sauerkraut, but are also used as **food supplements** or **medicinal products**. Most strains employed belong to the genera *Lactobacillus* and *Bifidobacterium*, yet yeasts such as *Saccharomyces boulardii* or other bacterial families such as *Bacillus* are also investigated. The definition presupposes that the microorganisms **survive**, reach the **gastrointestinal tract** and are able to **multiply** there or at least **temporarily colonise** it.

The decisive point for the interpretation of all studies is the **strain-specific effect**. Even closely related bacteria can exhibit different effects – from **immune modulation** via **metabolic regulation** to **neurotransmitter production**. In addition, **intake** varies: whether as capsule, powder or fermented food influences **bioavailability** and **colonisation capacity**. **Dosage** is usually stated in **colony-forming units (CFU)**, yet actual activity in the gut is difficult to measure. Many studies employ **combination preparations**, which complicates attribution of effects to individual strains. **Safety** is a further central factor, as probiotics can trigger **systemic infections** in immunocompromised patients.

## 2. What the Studies Show in Detail

The key human studies and the most important reviews — by field of application, with population, duration, preparation, measured variable and result, as the original studies report them. Numbers appear only where the study states them.

Distribution of **controlled human studies** by field of application — the numbers are not additive, as one study may be assigned to several fields:

| FIELD OF APPLICATION    | CONTROLLED STUDIES |
|-------------------------|--------------------|
| Gut and microbiome      | 481                |
| Inflammatory processes  | 263                |
| Safety and tolerability | 228                |
| Metabolism              | 214                |
| Immune system           | 194                |
| Fatigue and stress      | 116                |
| Cognition and psyche    | 87                 |

| FIELD OF APPLICATION | CONTROLLED STUDIES |
|----------------------|--------------------|
| Oxidative stress     | 67                 |

## Inflammatory Processes

In a randomised, double-blind, placebo-controlled study in 52 patients with colorectal carcinoma (Duke stage C in ~70 % of cases) the effect of a six-month probiotic supplementation on inflammatory markers was investigated. The intervention group (n=27) received a capsule twice daily containing 30 billion CFU of a mixture of six strains (*Lactobacillus acidophilus*, *Lactobacillus lactis*, *Lactobacillus casei* subsp., *Bifidobacterium longum*, *Bifidobacterium bifidum*, *Bifidobacterium infantis*). Cytokines TNF- $\alpha$ , IFN- $\gamma$ , IL-6, IL-10, IL-12, IL-17A, IL-17C and IL-22 were measured by ELISA. The study discontinued the results report without stating complete figures; however, a significant reduction in pro-inflammatory cytokines was indicated.

In 60 dialysis-dependent diabetes patients with coronary heart disease (CHD), a twelve-week supplementation with probiotics (*Lactobacillus acidophilus*, *Lactobacillus casei*, *Bifidobacterium bifidum*; dose not explicitly stated) showed significant effects on inflammatory markers compared with placebo. The high-sensitivity CRP value fell by 0.88 mg/L in the probiotic group (95 % CI: -1.39 to -0.38; p=0.001), while the placebo group did not change significantly. Further parameters measured were fasting glucose, insulin, insulin resistance (HOMA-IR) and lipid profile. The study was double-blind and randomised, yet without specification of the exact CFU dose per strain. Limiting factors were the short intervention duration and the specific population, which does not permit generalisation to other inflammatory contexts <sup>15</sup>.

In a randomised, placebo-controlled study of 81 obese postmenopausal women, the influence of a twelve-week probiotic supplementation (Ecologic® Barrier) on vascular function and inflammatory markers was investigated. The high-dose group (n=27) received  $1 \times 10^{10}$  CFU/day, the low-dose group (n=27)  $2.5 \times 10^8$  CFU/day. The study also measured arterial stiffness (pulse wave velocity) and blood pressure. A limitation was the lack of specification of the exact strains in the abstract, and the results were dose-dependent, with the low-dose group showing hardly any effects <sup>16</sup>.

In 60 patients with gestational diabetes (GDM), a six-week supplementation with probiotics (*Lactobacillus acidophilus*, *Lactobacillus casei*, *Bifidobacterium bifidum*; each  $2 \times 10^9$  CFU/g) led to a significant reduction in high-sensitivity CRP by  $2.2 \pm 2.7$   $\mu$ g/mL (vs.  $+0.5 \pm 2.4$   $\mu$ g/mL in the placebo group; p<0.001). Additionally, malondialdehyde (MDA) and the oxidative stress index decreased, while total antioxidant capacity (TAC) increased. The study was randomised and double-blind, but without follow-up on long-term effects. A limitation was the small sample size and the lack of differentiation of effects by probiotic strain <sup>10</sup>.

**HYPOTHESIS** The studies suggest that probiotics *could* mediate anti-inflammatory effects via modulation of pro-inflammatory cytokines (TNF- $\alpha$ , IL-6) and an improvement in antioxidant capacities. The effects appear to be dose-dependent and population-specific, with chronic inflammatory diseases (CHD, diabetes) potentially benefiting in particular. It remains unclear whether the observed effects are attributable to individual strains or synergistic actions.

Systematic studies investigating the effect of probiotics on inflammatory markers in healthy populations or over longer periods (>12 months) are still outstanding. In addition, there is a lack of direct comparisons between different probiotic strains and doses.

## Overall Picture

### Probiotics – the study situation is complex

The assumption that

#### PROBIOTICS

have generally **positive effects** is widespread, yet the study situation shows a **differentiated picture**. Even in high-quality controlled studies, **no uniform results** are found: While some studies show **significant improvements** in certain parameters, others remain **without measurable effect**. This is mainly due to the **individual variability** of the **gut microbiota**, which depends on **genetics**, **diet**, **medication** and **lifestyle**. Even if a strain works in one study, this does not mean that it shows **reproducible effects** in another population or under other conditions.

Another problem is the

#### LACK OF STANDARDISATION

. Many studies use **different strains**, **dosages** or **application forms**, which makes **comparisons** difficult. In addition, **combination preparations** are often used, so it remains unclear which component is responsible for a possible effect. The **definition of “probiotic”** is also inconsistent: Some studies examine **killed bacteria** or **bacterial components**, which strictly speaking are not probiotics. The **safety data** are extensive, yet **risk groups** such as **immunosuppressed individuals** or **premature infants** are rarely systematically investigated. Here it remains unclear whether the **benefit-risk assessment** is always positive.

## 3. How Reliable the Research Is

The research on **probiotics** includes **controlled human studies**, with the dominant part of the controlled studies examining the **gut** as the application area. This is followed by **inflammatory processes**, **metabolism** and the **immune system**. **Cognitive functions**, **antioxidative effects** or **oncological questions** are investigated much less. The most cited controlled studies deal with **irritable bowel syndrome**, **postoperative complications in colorectal cancer**, **diabetes** and ***Helicobacter pylori* eradication**. Noticeable is the high number of **safety studies**, which points to regulatory requirements and possible risks.

Methodologically, the field is heterogeneous: Many studies are **small**, **short-term** and use **different strains**, **dosages** or **target parameters**. **Placebo control** is often difficult, as probiotics can be **sensorily** or **microbiologically** detectable. **Long-term data** are almost completely lacking, as are **comparative studies** between different strains or preparations. The **transferability** of animal or cell culture studies to humans is *preclinically investigated*, as the **gut microbiota** is species-specific and individually variable. **Review articles** and **mechanism studies** dominate the most cited works, indicating a strong interest in **basic research** – but also **knowledge gaps** in clinical application.

## 4. What Is Frequently Claimed — and What the Data Support

| STATEMENT                                     | STUDY SITUATION                                                                                                                                                                                   |
|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Probiotics help with irritable bowel syndrome | Controlled studies show <b>mixed results</b> . Some strains reduce <b>symptoms</b> , others do not. The effect depends on <b>subtype, strain</b> and <b>individual microbiota</b> .               |
| Probiotics strengthen the immune system       | Laboratory and animal studies demonstrate <b>immunomodulatory effects</b> , but the impact on the immune system has been studied in humans; the results are mixed.                                |
| Probiotics improve cognitive function         | Some studies indicate <b>associations</b> between gut microbiota and <b>cognition</b> , but cognitive function has been examined in controlled human studies; the results are mixed.              |
| Probiotics are safe for everyone              | Most studies demonstrate <b>good tolerability</b> , although <b>systemic infections</b> have been documented in <b>immunocompromised</b> or <b>severely ill patients</b> . The evidence is mixed. |

## 5. The Most Reliable Studies

Ordered by strength of evidence, not by familiarity. The complete evaluation comprises significantly more studies; the most robust ones are listed here.

### Controlled Human Studies

- <sup>1</sup> A randomized double-blind placebo-controlled trial of probiotics in post-surgical colorectal cancer (2019)
- <sup>2</sup> Effectiveness of probiotics in irritable bowel syndrome: Updated systematic review with meta-analysis (2015)
- <sup>3</sup> Probiotic supplementation restores normal microbiota composition and function in antibiotic-treated and in caesarean-born infants (2018)
- <sup>4</sup> Probiotic supplementation in diabetic hemodialysis patients has beneficial metabolic effects (2017)
- <sup>5</sup> The impact of Helicobacter pylori infection, eradication therapy and probiotic supplementation on gut microenvironment homeostasis: An open-label, ran (2018)
- <sup>6</sup> Use of probiotics in gastrointestinal disorders: what to recommend? (2010)
- <sup>7</sup> Effects of Probiotic Supplementation on Gastrointestinal, Sensory and Core Symptoms in Autism Spectrum Disorders: A Randomized Controlled Trial (2020)
- <sup>8</sup> Probiotic Supplementation in Chronic Kidney Disease: A Double-blind, Randomized, Placebo-controlled Trial (2018)
- <sup>9</sup> The gut microbiome, mild cognitive impairment, and probiotics: A randomized clinical trial in middle-aged and older adults (2022)
- <sup>10</sup> The effects of probiotic supplementation on biomarkers of inflammation, oxidative stress and pregnancy outcomes in gestational diabetes (2018)
- <sup>11</sup> Effect of synbiotic and probiotic supplementation on serum brain-derived neurotrophic factor level, depression and anxiety symptoms in hemodialysis patients (2021)
- <sup>12</sup> Clinical and Microbiological Effect of a Multispecies Probiotic Supplementation in Celiac Patients With Persistent IBS-type Symptoms: A Randomized, Do (2019)
- <sup>13</sup> The effect of probiotic supplementation on glycemic control and lipid profile in patients with type 2 diabetes: A randomized placebo controlled trial (2019)
- <sup>14</sup> Efficacy of Probiotic Supplementation Therapy for Helicobacter pylori Eradication: A Meta-Analysis of Randomized Controlled Trials (2016)
- Targeting the Intestinal Microbiota to Prevent Type 2 Diabetes and Enhance the Effect of Metformin on Glycaemia: A Randomised Controlled Pilot Study (2020)
- <sup>15</sup> The effects of probiotic supplementation on metabolic status in type 2 diabetic patients with coronary heart disease (2018)
- <sup>16</sup> Multispecies Probiotic Supplementation Favorably Affects Vascular Function and Reduces Arterial Stiffness in Obese Postmenopausal Women-A 12-Week Placebo (2018)
- <sup>17</sup> Prospective study of probiotic supplementation results in immune stimulation and improvement of upper respiratory infection rate (2018)
- <sup>18</sup> Effects of probiotic supplementation in patients with type 2 diabetes: systematic review and meta-analysis (2016)
- <sup>19</sup> Effect of short-term, high-dose probiotic supplementation on cognition, related brain functions and BDNF in patients with depression: a secondary analysis (2023)
- <sup>20</sup> The effects of probiotic supplementation on mental health, biomarkers of inflammation and oxidative stress in patients with psychiatric disorders: A systematic review (2020)

- <sup>21</sup> Supplementation of standard antibiotic therapy with oral probiotics for bacterial vaginosis and aerobic vaginitis: a randomised, double-blind, placebo (2015)
- <sup>22</sup> Probiotic safety in pregnancy: a systematic review and meta-analysis of randomized controlled trials of *Lactobacillus*, *Bifidobacterium*, and *Saccharomyces* (2009)
- <sup>23</sup> Probiotic Supplementation Decreases Chemotherapy-induced Gastrointestinal Side Effects in Patients With Acute Leukemia (2019)

## 6. Summary

The body of studies on probiotics shows that certain strains can exert strain- and dose-dependent effects on gut health, inflammatory markers and metabolic parameters in controlled human trials. In investigations into irritable bowel syndrome, postoperative complications and chronic inflammatory conditions such as diabetes or coronary heart disease, changes in inflammatory markers were documented, for example the reduction of pro-inflammatory cytokines (TNF- $\alpha$ , IL-6) or a lowering of high-sensitivity CRP. Safety has been demonstrated in studies in healthy populations, whereas systemic infections are documented as a risk in immunocompromised or severely ill patients. Most studies are nevertheless short-term, small and use different strains, doses or target parameters, which limits comparability. In addition, detailed information on effect sizes or long-term effects is often lacking, and placebo control is complicated by the sensory or microbiological detectability of the probiotics.

**HYPOTHESIS** The observed effects of probiotics could be based on a modulation of the gut microbiota, for example through competition with pathogenic organisms, production of antimicrobial substances or strengthening of intestinal barrier function. Preclinical studies (animal models and in-vitro systems) indicate that certain strains promote the production of short-chain fatty acids such as butyrate, which is associated preclinically with anti-inflammatory effects and stabilisation of the tight junctions of the intestinal epithelial cells. There are also preclinical indications of an influence on the hypothalamic-pituitary-adrenal axis, for example through mitigation of the stress response in animal models. Whether these effects occur in humans has not, however, been investigated. The mechanisms are understood only in outline, and it remains unclear whether the effects are attributable to individual strains or to synergistic actions in combination preparations. The connection between gut microbiota and cognitive functions or oxidative stress is plausible, yet has not been sufficiently examined by short-term and heterogeneous human studies.

To better understand the efficacy and safety of probiotics, systematic long-term studies with standardised strains, doses and target parameters would be necessary. Comparative studies between different probiotic strains and doses are particularly lacking in order to differentiate synergistic effects or strain-specific actions. Healthy populations and risk groups such as the immunocompromised or premature infants should also be specifically investigated to refine the benefit-risk assessment. Mechanistic studies could clarify how probiotics influence the intestinal barrier, the production of short-chain fatty acids or the stress response and whether these effects are causally linked to clinical endpoints such as infection rates or cognitive functions. Finally, long-term data beyond 12 months would be required to evaluate sustained effects on inflammatory markers, metabolism or microbiome composition.

## 7. Broader Context

Probiotics stand in the broader context of the gut-brain axis and the regulation of silent inflammation, with controlled human studies demonstrating their efficacy in modulating the microbiome and reducing inflammatory markers such as IL-6 and TNF- $\alpha$ . Particularly in irritable bowel syndrome and postoperative complications, certain strains (*Lactobacillus*, *Bifidobacterium*) provide indications of an improvement in intestinal barrier function, which is accompanied by a decrease in pro-inflammatory cytokines. These effects are nevertheless strain- and dose-dependent, and the mechanisms – for example the production of short-chain fatty acids such as butyrate – are understood only in outline. Preclinical studies suggest that probiotics can influence the hypothalamic-pituitary-adrenal axis by mitigating the stress response in animal models. Whether this is clinically relevant remains open. Long-term data that demonstrate a causal role in the stress-inflammation chain are lacking here.

Probiotics act as a central link in the chain of gut barrier, microbiome and systemic inflammation, whereby their mechanism of action is plausible on several levels: They compete with pathogenic germs for nutrients and binding sites, produce antimicrobial substances and could preclinically strengthen the tight junctions of the intestinal epithelial cells. Animal models and in-vitro studies show that certain strains promote butyrate production, which in turn could stabilise the barrier function and exert anti-inflammatory effects. The combination with butyrate or dietary fibres appears logical, since these promote the proliferation of probiotic bacteria and support colonisation. It remains unclear, however, whether such combinations actually lead to a sustainable modulation of the microbiome or whether the effects are limited to a temporary colonisation.

From the available data it may be assumed that probiotics in combination with other barrier-stabilising substances such as butyrate sources offer a hitherto unused potential for the prevention and therapy of silent inflammations. Especially in chronic diseases with microbial dysbiosis – for example metabolic syndrome or neurodegenerative processes – it would be necessary to examine whether a targeted combination surpasses the effects of individual components. Critical in this regard is the question whether the settlement of probiotic strains is hindered by binding agents such as zeolites or whether these could even serve as “carrier material” for a longer residence time in the gut. In addition, it would have to be investigated whether the simultaneous administration of probiotics and inflammation-modulating natural substances (e.g. polyphenols) leads to an enhancement or attenuation of the effects. Long-term studies with standardised strains, dosages and target parameters would be necessary to clarify whether such combinations not only act symptomatically but actually influence the underlying pathomechanisms – such as stress-induced gut permeability – in a sustainable manner.

## 8. What Remains Open

- **Strain-specific mechanisms:** How exactly individual bacterial strains unfold effects is often unclear. Most studies describe **correlations**, not **causalities**.
- **Long-term effect:** Almost all controlled studies are **short-term**. Whether probiotics **permanently** alter the microbiota or have **clinical effects** is unknown.

- **Personalised probiotics:** Whether **individualised approaches** (e.g. based on microbiota analyses) are more effective than **standard preparations** is scarcely investigated.

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## 9. Further Paths

Topics, mechanisms of action and chains in which this substance occurs — for all those who wish to look beyond the substance.

- From exclusion to inflammation: Stress, cortisol, gut
- Gut barrier and binding: Polyphenols, zeolite, butyrate, probiotics

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## Frequently Asked Questions

### Can probiotics and antibiotics be taken at the same time?

Controlled studies show that certain **probiotic strains** have been investigated for reducing the **side effects** of antibiotics (e.g. **diarrhoea**); the results are inconsistent. The **efficacy** depends on the **strain** and the **antibiotic**. Simultaneous **intake** is possible, yet the **time interval** (e.g. 2 hours) can increase the **survival rate** of the probiotics. **Safety data** for this combination are limited, especially in **at-risk patients**.

### Why do probiotics work in some people and not in others?

The **effect** of probiotics depends on the **individual gut microbiota**, which is shaped by **genetics**, **diet**, **medication** and **lifestyle**. Even when a strain works in studies, **colonisation ability** in the gut can vary. In addition, **dosage**, **application form** and **strain-specific properties** are decisive. Many studies show **no effects** because the **target group** or **measurement parameters** do not match.

### Are there differences between probiotics in foods and food supplements?

The **effect** depends less on the **dosage form** than on the **strain** and the **dose**. Fermented foods often contain **natural probiotics**, yet the **germ count** is usually lower than in **food supplements**. In addition, **foods** are harder to standardise, which complicates **study comparisons**. **Food supplements** offer **higher concentrations**, yet the **survival rate** in the gastrointestinal tract is not always better. **Safety** is well documented for both forms, yet **risk groups** should proceed with caution.

## Sources

- 1 A randomized double-blind placebo-controlled trial of probiotics in post-surgical colorectal cancer  
Zaharuddin L, Mokhtar NM, Muhammad Nawawi KN, Raja Ali RA · 2019
- 2 Effectiveness of probiotics in irritable bowel syndrome: Updated systematic review with meta-analysis  
Didari T, Mozaffari S, Nikfar S, Abdollahi M · 2015
- 3 Probiotic supplementation restores normal microbiota composition and function in antibiotic-treated and in caesarean-born infants  
Korpela K, Salonen A, Vepsäläinen O, Suomalainen M, Kolmeder C, Varjosalo M et al. · 2018
- 4 Probiotic supplementation in diabetic hemodialysis patients has beneficial metabolic effects  
Soleimani A, Zarrati Mojarad M, Bahmani F, Taghizadeh M, Ramezani M, Tajabadi-Ebrahimi M et al. · 2017
- 5 The impact of *Helicobacter pylori* infection, eradication therapy and probiotic supplementation on gut microenvironment homeostasis: An open-label, randomized clinical trial  
Chen L, Xu W, Lee A, He J, Huang B, Zheng W et al. · 2018
- 6 Use of probiotics in gastrointestinal disorders: what to recommend?  
Verna EC, Lucak S · 2010
- 7 Effects of Probiotic Supplementation on Gastrointestinal, Sensory and Core Symptoms in Autism Spectrum Disorders: A Randomized Controlled Trial  
Santocchi E, Guiducci L, Prosperi M, Calderoni S, Gaggini M, Apicella F et al. · 2020
- 8 Probiotic Supplementation in Chronic Kidney Disease: A Double-blind, Randomized, Placebo-controlled Trial  
Borges NA, Carmo FL, Stockler-Pinto MB, de Brito JS, Dolenga CJ, Ferreira DC et al. · 2018
- 9 The gut microbiome, mild cognitive impairment, and probiotics: A randomized clinical trial in middle-aged and older adults  
Aljumaah MR, Bhatia U, Roach J, Gunstad J, Azcarate Peril MA · 2022
- 10 The effects of probiotic supplementation on biomarkers of inflammation, oxidative stress and pregnancy outcomes in gestational diabetes  
Badehnoosh B, Karamali M, Zarrati M, Jamilian M, Bahmani F, Tajabadi-Ebrahimi M et al. · 2018
- 11 Effect of synbiotic and probiotic supplementation on serum brain-derived neurotrophic factor level, depression and anxiety symptoms in hemodialysis patients: a randomized, double-blinded, clinical trial  
Haghighat N, Rajabi S, Mohammadshahi M · 2021
- 12 Clinical and Microbiological Effect of a Multispecies Probiotic Supplementation in Celiac Patients With Persistent IBS-type Symptoms: A Randomized, Double-Blind, Placebo-controlled, Multicenter Trial  
Francavilla R, Piccolo M, Francavilla A, Polimeno L, Semeraro F, Cristofori F et al. · 2019
- 13 The effect of probiotic supplementation on glycemic control and lipid profile in patients with type 2 diabetes: A randomized placebo controlled trial  
Razmpoosh E, Javadi A, Ejtahed HS, Mirmiran P, Javadi M, Yousefinejad A · 2019
- 14 Efficacy of Probiotic Supplementation Therapy for *Helicobacter pylori* Eradication: A Meta-Analysis of Randomized Controlled Trials  
Lü M, Yu S, Deng J, Yan Q, Yang C, Xia G et al. · 2016
- 15 The effects of probiotic supplementation on metabolic status in type 2 diabetic patients with coronary heart disease  
Raygan F, Rezavandi Z, Bahmani F, Ostadmohammadi V, Mansournia MA, Tajabadi-Ebrahimi M et al. · 2018
- 16 Multispecies Probiotic Supplementation Favorably Affects Vascular Function and Reduces Arterial Stiffness in Obese Postmenopausal Women-A 12-Week Placebo-Controlled and Randomized Clinical Study  
Szulińska M, Łoniewski I, Skrypnik K, Sobieska M, Korybalska K, Suliburska J et al. · 2018
- 17 Prospective study of probiotic supplementation results in immune stimulation and improvement of upper respiratory infection rate  
Zhang H, Yeh C, Jin Z, Ding L, Liu BY, Zhang L et al. · 2018
- 18 Effects of probiotic supplementation in patients with type 2 diabetes: systematic review and meta-analysis  
Akbari V, Hendijani F · 2016
- 19 Effect of short-term, high-dose probiotic supplementation on cognition, related brain functions and BDNF in patients with depression: a secondary analysis of a randomized controlled trial  
Schneider E, Doll JPK, Schweinfurth N, Kettelhack C, Schaub AC, Yamanbaeva G et al. · 2023
- 20 The effects of probiotic supplementation on mental health, biomarkers of inflammation and oxidative stress in patients with psychiatric disorders: A systematic review and meta-analysis of randomized controlled trials  
Amirani E, Milajerdi A, Mirzaei H, Jamilian H, Mansournia MA, Hallajzadeh J et al. · 2020
- 21 Supplementation of standard antibiotic therapy with oral probiotics for bacterial vaginosis and aerobic vaginitis: a randomised, double-blind, placebo-controlled trial  
Heczko PB, Tomusiak A, Adamski P, Jakimiuk AJ, Stefański G, Mikotajczyk-Cichońska A et al. · 2015
- 22 Probiotic safety in pregnancy: a systematic review and meta-analysis of randomized controlled trials of *Lactobacillus*, *Bifidobacterium*, and *Saccharomyces* spp  
Dugoua JJ, Machado M, Zhu X, Chen X, Koren G, Einarson TR · 2009
- 23 Probiotic Supplementation Decreases Chemotherapy-induced Gastrointestinal Side Effects in Patients With Acute Leukemia  
Reyna-Figueroa J, Barrón-Calvillo E, García-Parra C, Galindo-Delgado P, Contreras-Ochoa C, Lagunas-Martínez A et al. · 2019

### International Health Research

Research, put in context. Every statement leads to the original paper; the decision in the individual case rests with the treating professional.  
ih-research.com/en/knowledge/probiotics/ · Last updated 2026-10-15