Next-Gen Postbiotic Innovation

***Lactobacillus gasseri* CP2305**

ADM®

Discover how ***Lactobacillus gasseri* CP2305**, a cutting-edge postbiotic backed by gold-standard science, supports core health areas associated with evolving consumer needs in functional wellness.

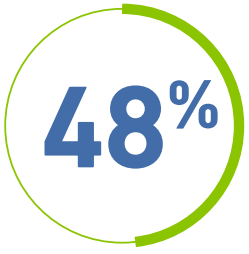
Backed by eight human clinical trials, this versatile ingredient offers unmatched formulation stability for dietary supplements, functional foods and powdered beverages. By connecting priority health areas to one underlying mechanism, modulation of the gut-brain axis, *L. gasseri* CP2305 Postbiotic sets **a new standard for mental**, **emotional** and **physical wellness**.

Mental Well-Being: A Defining Health Priority

Mental well-being is a critical global health concern, shaped by the increasing pace and complexity of modern life. According to the World Health Organization (WHO), more than a billion people worldwide live with a mental health condition, underscoring the scale and urgency of the issue.[1]

Globally, 74% of consumers agree they are on a continual journey of improving and maintaining good health.[2] A range of stressors drive this heightened focus, including financial pressures outside individual control such as inflation and economic instability, concerns about children's futures, family relationships, environmental challenges like climate change, as well as chronic sleep deprivation and workplace or school-related demands.[3]

Sleep and stress, in particular, play a critical role in shaping mental well-being. The consequences of inadequate sleep and elevated stress levels are far-reaching, impacting numerous aspects of daily functioning and overall well-being. In fact, 73% of consumers say they suffer from feelings of stress, while 45% of global consumers experience nightly sleep problems.[4] Notably, women are twice as likely to suffer from mental well-being conditions, positioning them as a key demographic in the search for effective solutions.[5]



of individuals suffer mental well-being issues before the age of 18[6]

Globally, well-being has shifted from a focus on physical health and fitness to an emphasis on a more holistic understanding that integrates both physical and mental health. Consumers are becoming increasingly aware of the potential of the gut-brain axis to support well-being and seek solutions to support mood, stress management, relaxation, better sleep and improved cognitive function.[7]

This growing awareness, combined with mounting scientific validation, creates a significant opportunity for the development of integrated, science-backed, gut-brain-focused products that align with today's holistic approach to health and well-being.

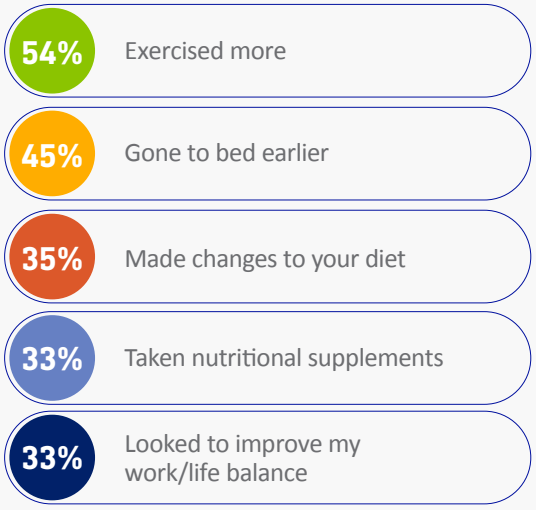
75% **of consumers recognize a link between cognitive and overall health[4]**

53% **of consumers regularly seek out products to aid cognitive health[4]**

Consumers Address Their Diet & Lifestyle to Enhance Cognitive Health for Different Reasons

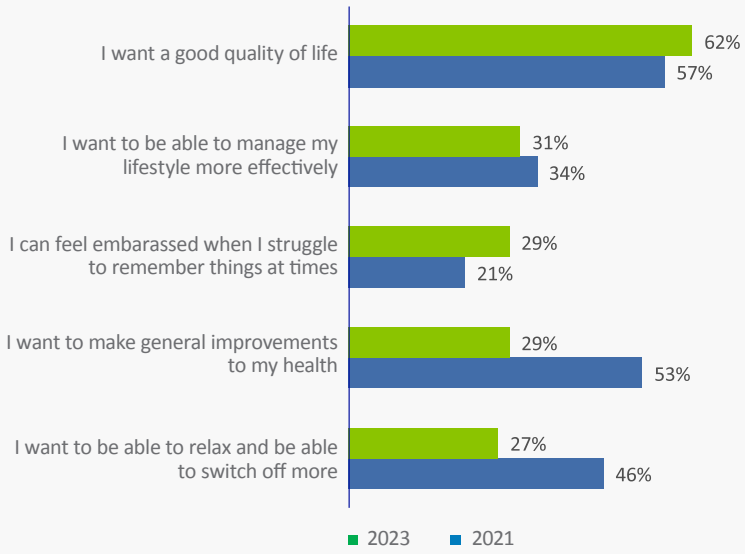
Have you taken any steps to improve your cognitive health over the last 12 months?[4]

Global, 2023 - Top 5 answers



Why are you interested in improving your cognitive health?[4]

Global - Top 5 answers - Consumers who have looked to address their cognitive health in the last 12 months

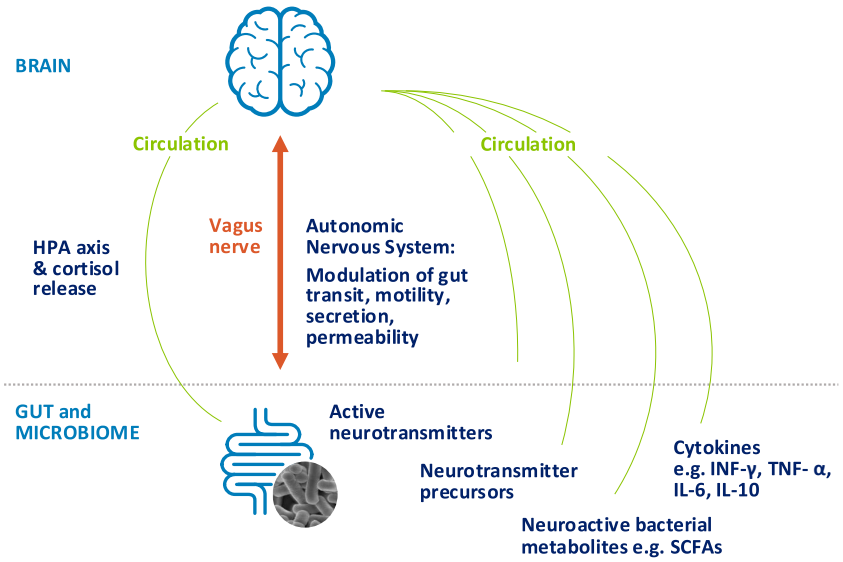


The Emerging Role of the Gut-Brain Axis

Recent scientific advancements highlight the pivotal role of the gut-brain axis, a complex, bidirectional communication system that links the gastrointestinal tract and the central nervous system, enabling continuous signaling between the gut microbiome and the brain. This connection has emerged as a primary area of focus in advancing understanding of the integration between mental and physical health.

At the core of this system lies the gut microbiome, a complex ecosystem of microorganisms essential in mediating communication between the gut and the brain. This occurs through several interconnected pathways, including direct signaling via the vagus nerve, the production of neurotransmitters and short-chain fatty acids, influencing the hypothalamic-pituitary-adrenal (HPA) axis and dynamic interactions with the immune system.[8,9]

The Two-Way Communication System: Gut-Brain Axis



Routes involved in the gut microbiome communication with the brain:[10]

Neuronal (vagus nerve, precursors/neurotransmitters)

Immune/inflammation (cytokines)

Endocrine (HPA: hypothalamic-pituitary-adrenal axis, stress hormones)

Source: Chudzik A; et al. (2021). Biomolecules. 11:1000

These mechanisms, coupled with advances in microbiome science, demonstrate the gut is not only essential for digestion and nutrient absorption, but also plays a crucial role in the functioning of neurological and psychological processes. As a result, the gut-brain axis is increasingly recognized as a key pathway through which physiological states can influence mood stability, cognition, sleep patterns and stress responsiveness.

Emerging evidence further demonstrates that individuals experiencing mental health challenges often exhibit distinct alterations in gut microbiota patterns. This may include changes in microbial diversity, reductions in beneficial anti-inflammatory and butyrate-producing bacteria, and increases in bacteria associated with pro-inflammatory activity.[11] Shifts in microbial balance are increasingly understood to contribute to dysregulation within the gut-brain axis, potentially exacerbating both mental and physical health conditions.

Postbiotics: A Next-Generation Microbiome Solution

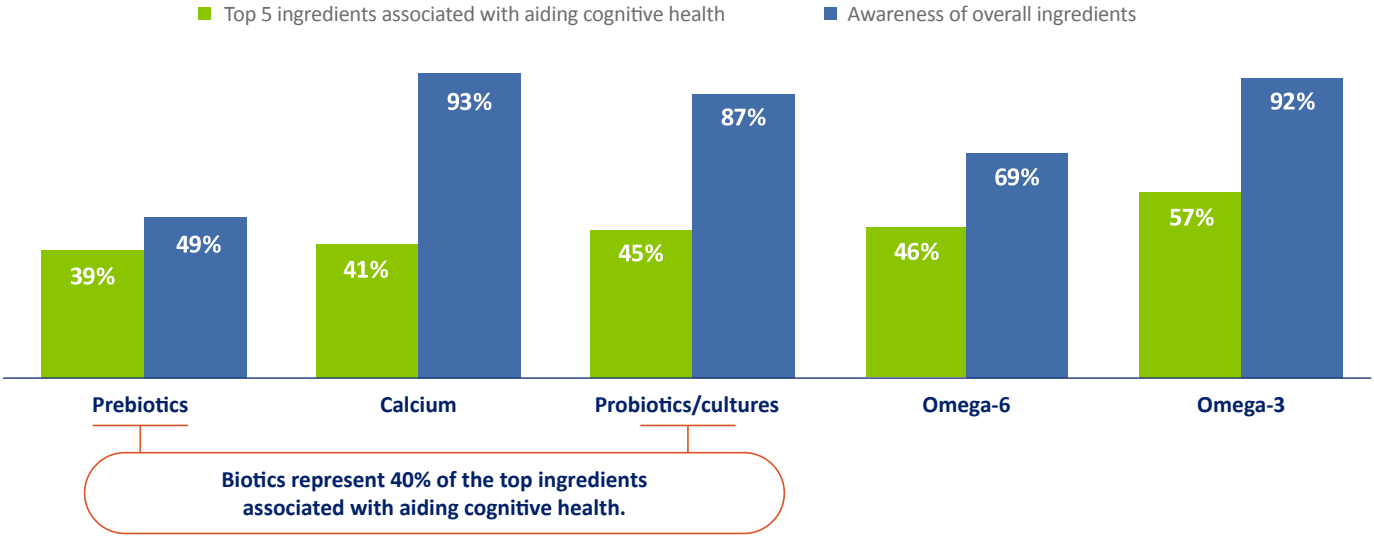
Postbiotics represent a significant advancement in microbiome science, offering a new and highly practical approach to modulating the gut-brain axis. Scientifically defined as "a preparation of inanimate microorganisms and/or their components that confers a health benefit on the host,"[12] postbiotics differ fundamentally from traditional microbiome solutions.

While probiotics rely on the viability of living organisms to deliver benefits, postbiotics consist of non-living microorganisms and/or their bioactive components, enabling better stability. This distinction is particularly relevant in the context of product development, where consistency, stability and targeted functionality are critical.

54% **of consumers are familiar with the benefits of postbiotics[13]**

Biotics represent **40%** **of ingredients associated with aiding cognitive health[4]**

Global - Top 5 ingredients associated with aiding cognitive/mental health[4]



From a formulation and product development perspective, postbiotics offer clear advantages. Their non-viable nature offers unparalleled stability across a wide range of environmental conditions, including temperature, humidity and processing stressors. As a result, postbiotics are less susceptible to degradation during manufacturing, storage and distribution, ensuring that their functional properties remain intact throughout the product lifecycle.

Their superior stability allows postbiotics to preserve their clinical efficacy across a wide range of delivery formats, enabling seamless incorporation into diverse applications, including dietary supplements and functional foods and powdered beverages. This flexibility enables manufacturers to develop innovative, consumer-friendly products that align with the growing demand for convenient, multifunctional health solutions. As interest in the gut-brain axis continues to expand, postbiotics are uniquely positioned to support the next generation of science-backed, scalable interventions targeting both mental and physical well-being.

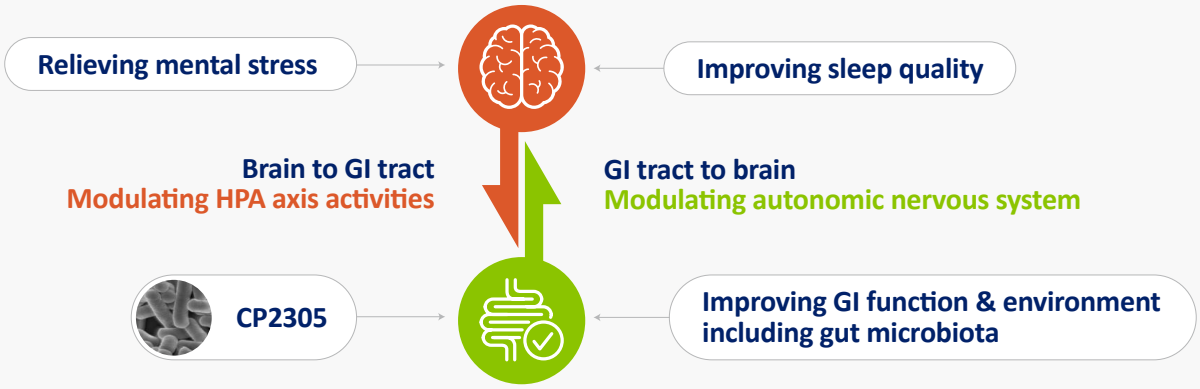
Lactobacillus gasseri CP2305 Postbiotic

Backed by eight human clinical trials, *L. gasseri* CP2305 is a unique, heat-treated postbiotic and the only postbiotic currently available with clinical evidence supporting five distinct health areas, including **sleep**, **stress**, **mood**, **women's health and recovery after exercise**.

Gut-Brain Axis Interaction

This strain leverages the potential of the gut-brain axis by modulating the gut microbiome.[14]
This modulation may occur via three routes:

- Neuronal (vagus nerve, neurotransmitter precursors)
- Immune/inflammatory (cytokines)
- Endocrine (HPA axis, stress hormones)



In a human clinical trial, consumption of *L. gasseri* CP2305 Postbiotic reduced self-reported State-Trait Anxiety Inventory (STAI) scores in individuals experiencing stress and anxiety. Secondary endpoints identified that the postbiotic modulates the production of valeric acid, a short-chain fatty acid (SCFA).[14] This natural and holistic ingredient not only provides a potential aid for sleep, mood and stress by acting as a neuroprotector, but also supports the body's metabolism overall.

DOCUMENTED RESULTS

Clinical trials suggest that supplementing diet with *Lactobacillus gasseri* CP2305 Postbiotic may support:[14,15]

- Emotional well-being
- Reduced stress

Exploratory research, based on 2-arm, randomized, double-blind, placebo-controlled studies, suggests supplementing diet with 20mg of *L. gasseri* CP2305 Postbiotic daily may support:

- Better sleep efficiency
- Reduced time to fall asleep/reduced sleep latency
- Overall sleep quality
- Improved total duration of sleep
- Significant improvement in self-reported assessments of mental well-being

Targeted Solutions for Stress & Mood Regulation

Stress and mood are pressing concerns for consumers, shaping choices across food, beverage and wellness categories. Globally, consumers increasingly turn to functional foods, beverages and supplements positioned around mood, relaxation and cognitive support—reflecting a broader shift toward proactive, everyday solutions that support emotional well-being, stress reduction and mental balance.[16]

7 in 10 consumers are worried about cost-of-living in their country.[4]

THE SCIENCE OF STRESS & MOOD

Clinical studies show that 20mg of *L. gasseri* CP2305 Postbiotic daily may support:[14,15]

- Emotional well-being
- Reduced stress
- Improvement in self-reported assessments of mental well-being

RANDOMIZED CONTROLLED TRIAL (RCT) 1:

In a 5-week study of healthy students (21 male, 11 female) under academic stress, *L. gasseri* CP2305 Postbiotic improved stress levels with additional digestive health benefits versus placebo.

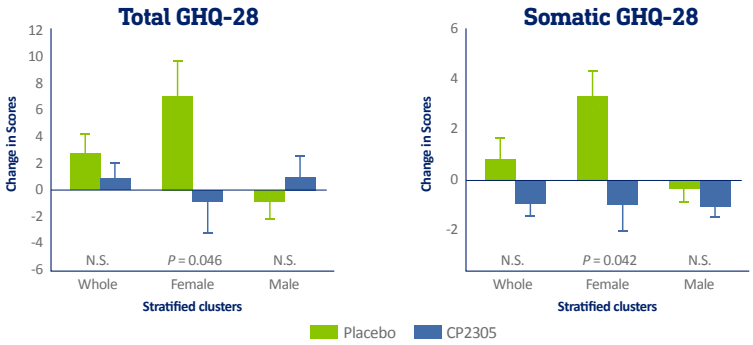
- Stress levels improved in women (GHQ-28; p=0.046)**
- *Bacteroides vulgatus* (p=0.022) decreased and *Dorea longicatena* (p=0.054) tended to increase, which may be associated with improved insulin resistance and increased lean mass in women[15]
- Diarrhea scores (p=0.005) improved in men

2-arm, randomized, double-blind, placebo-controlled trial heat-treated *L. gasseri* CP2305 Postbiotic 20mg/day in fermented milk
**GHQ-28, or the General Health Questionnaire-28 is a self-report screening tool used to identify possible psychiatric disorders and assess psychological well-being by asking respondents to compare their current state to their usual state

Healthy students (21 males and 11 females) during cadaver dissection course

2-arm, randomized, double-blind, placebo-controlled trial heat-treated CP2305 10B cells/day in fermented milk

5 WEEKS



Stress level changes determined by GHQ-28 improved in the CP2305 group vs. placebo among women (p=0.046)

In addition:

CP2305 decreased *Bacteroides vulgatus* (p=0.022) and tends to increase *Dorea longicatena* (p=0.054) vs. placebo

- Increases in *Dorea longicatena* may be associated with improved insulin resistance in women[1] and may also be associated with increased lean mass[2]

Diarrhea scores were also improved with CP2305 (p=0.005) in men compared to placebo

Nishida et al., 2017 Journal of Applied Microbiology 123:1561-1570

RANDOMIZED CONTROLLED TRIAL (RCT) 2:

In a 12-week study of healthy medical students (40 male, 29 female) preparing for national exams, *L. gasseri* CP2305 Postbiotic significantly improved stress levels and physiological stress markers.

- Improvement in anxiety (STAI-State; p=0.035)** and stress (GHQ-28; p=0.047)*** among women
- Significantly lower stress-induced rise in basal salivary cortisol release compared to placebo, indicating a reduced biological stress response at both 6 and 12 weeks (p<0.05; p<0.001, respectively)****
- Improved expression of stress-responsive microRNAs (miR-144: p=0.033) and (miR-144: p=0.012), which may lead to increased levels of oxidative stress
- Reduced bowel movement frequency and improved consistency (p<0.001) under stressful conditions

2-arm, randomized, double-blind, placebo-controlled trial *L. gasseri* CP2305 20mg/day in fermented milk
** State-Trait Anxiety Inventory (STAI) scores are a self-reported measure of a person's long-term tendency to experience anxiety.
***GHQ-28, or the General Health Questionnaire-28 is a self-report screening tool used to identify possible psychiatric disorders and assess psychological well-being by asking respondents to compare their current state to their usual state
****Salivary Cortisol Concentration is a well-established biological marker of the body's physiological response to stress.

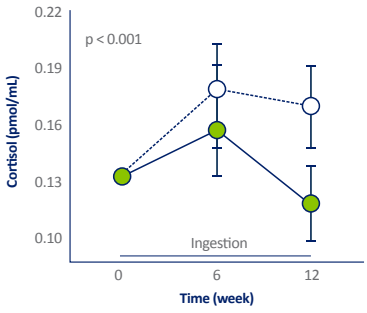
Lactobacillus gasseri CP2305 & Stress

Healthy students (40 males and 29 females) preparing for national exam as medical practitioners

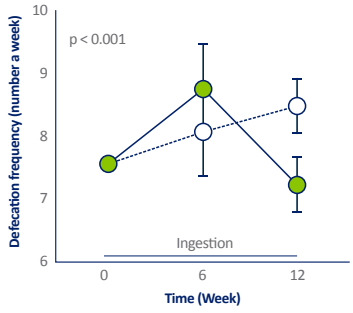
2-arm, randomized, double-blind, placebo-controlled trial CP2305 10B cells/day in fermented milk

12 WEEKS

Salivary cortisol



Defecation frequency



Placebo CP2305

Significant improvement in CP2305 group compared to placebo after 12 weeks in:[17]

Anxiety based on STAI-State (p=0.035) among women

- Stress based on GHQ-28 (p=0.047) among women

Improved basal salivary cortisol release from stress (p<0.001)

- Salivary cortisol release occurs during times of stress, and high levels of cortisol may be associated with unwanted health effects

Improved expression of stress-responsive microRNAs miR-144 (p=0.033) and miR-144*(p=0.012)

- Increased expression of miR-144 may lead to increased levels of oxidative stress*

Reduced bowel movement frequency (p<0.001) and improved consistency (p<0.001) under the stressful conditions

- High levels of stress may cause individuals to defecate more frequently, indicating that stress was in fact reduced

Nishida et al., 2017 Joumal of Functional Foods 36:112-121
**Sangokoya C, Telen MJ, ChiJT. 2010 Nov 18*

RANDOMIZED CONTROLLED TRIAL (RCT) 3:

In a 24-week study of medical students (41 male, 19 female) preparing for national exams, *L. gasseri* CP2305 Postbiotic significantly reduced anxiety and sleep disturbances versus placebo.

- Reduced anxiety (STAI-Trait; p=0.014)** based on a personality trait that describes a tendency to experience anxiety in specific situations[14]
- Reduced sleep disturbance (PSQI; p=0.041)***
- Significantly shortened sleep latency and wake time after sleep onset and increased delta power ratio in the first sleep cycle, as measured by electroencephalography (EEG) (p<0.05)
- Significantly reduced the salivary stress marker, chromogranin A (CgA; p=0.039)
- Attenuated stress-induced decline of *Bifidobacterium* and the stress-induced elevation of *Streptococcus spp.* and *Lachnospiraceae* (p<0.05)
- Valeric acid increased in the *L. gasseri* CP2305 Postbiotic group, but decreased in the placebo group (p<0.05)

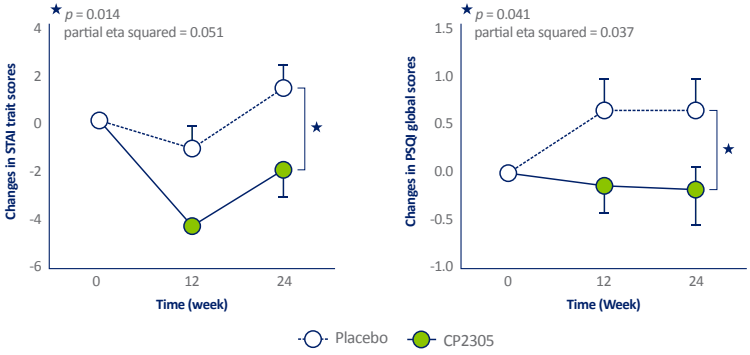
2-arm, randomized, double-blind, placebo-controlled trial heat-treated *L. gasseri* CP2305 Postbiotic tablets 20mg/day
** State-Trait Anxiety Inventory (STAI) scores are a self-reported measure of a person's long-term tendency to experience anxiety.
***Pittsburgh Sleep Quality Index (PSQI) is a self-rated questionnaire which assesses sleep quality and disturbances over a 1-month time interval.

Lactobacillus gasseri CP2305 & Stress

Healthy students (41 males and 19 females) preparing for national exam as medical practitioners

2-arm, randomized, double-blind, placebo-controlled trial heat-treated CP2305 tablets 10B cells/day

24 WEEKS



Significant improvement in CP2305 group compared to placebo in:[14]

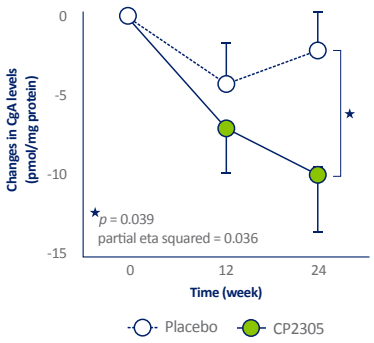
Compared to placebo, CP2305 tablet significantly reduced anxiety (p=0.014) based on STAI-Trait

- Trait anxiety is a personality trait that describes a tendency to experience anxiety in specific situations
- Participants noted STAI trait-based anxiety was reduced compared to placebo during the stressful task of preparing for their national exam as medical practitioners

Compared to placebo, CP2305 significantly shortened sleep latency and wake time after sleep onset and increased the delta power ratio in the first sleep cycle (p<0.05), as measured by EEG

- Delta power ratio is a measure of electroencephalographic (EEG) activity during slow-wave sleep (SWS) that may be associated with sleep quality and continuity
- Delta waves may be involved in many health-promoting processes, including cellular energy regulation and cognitive performance

Nishida et al., 2019 Nutrients 11:1859



Significant improvement in CP2305 group compared to placebo in:[14]

Compared to placebo, CP2305 tablet significantly reduced sleep disturbance (p=0.041) based on STAI-Trait and PSQI, respectively

CP2305 significantly reduced the salivary stress marker chromogranin A (CgA) vs. placebo (p=0.039)

CP2305 attenuated stress-induced decline of *Bifidobacterium spp.* and the stress-induced elevation of *Streptococcus spp.* and *Lachnospiraceae* (p<0.05, vs placebo)

- High levels of stress may impact our gut microbiota negatively. The stress encountered during this test was shown to decrease the abundance of beneficial *Bifidobacterium*, while simultaneously increasing *Streptococcus* in the placebo group.
- Use of CP2305 mitigated the reduction in *Bifidobacterium* caused by stress, and prevented the elevation of *Streptococcus*

Valeric acid increased in the CP2305 group but decreased in the placebo. Between group difference is significant (p<0.05).

- This short-chain fatty acid may have an impact on the gastrointestinal tract, however more studies are needed to prove a correlation

Targeting Sleep Through the Gut-Brain Axis

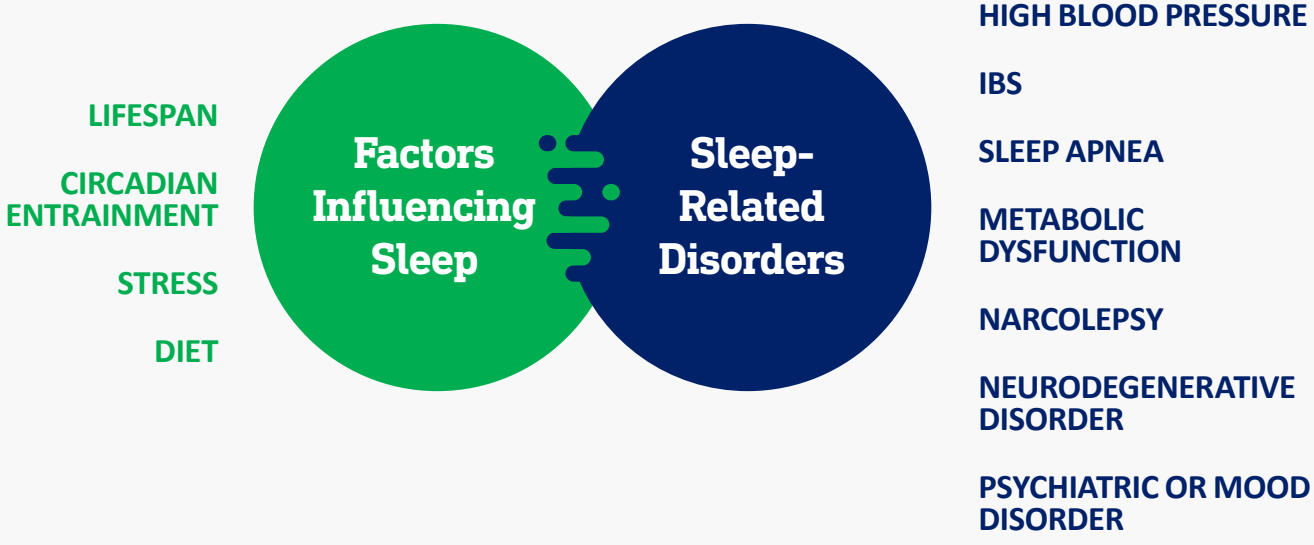
Quality sleep is the cornerstone of physical and mental health. However, up to 50-60% of individuals worldwide suffer from issues falling asleep and/or staying asleep.[18] Adequate and restorative sleep is linked to healthy immune function response, efficient stress management and improved cognitive function. Emerging science has shown that the gut-brain axis may be capable of influencing the sleep-wake cycle, impacting the duration and quality of sleep.[14,15,17]

> **58% of global consumers say they are actively looking to sleep well.[19]**

GUT MICROBIOTA AND SLEEP

Emerging evidence highlights a dynamic interplay between circadian rhythms, gut microbiota, sleep and stress, underscoring their collective impact on metabolic and overall health.

Approximately 10% of commensal gut bacteria in humans exhibit diurnal oscillations, while the microbiota itself can influence circadian rhythmicity. Disruptions to sleep—particularly poor or fragmented sleep—have been associated with metabolic dysregulation, including increased food intake, visceral adiposity, inflammation and insulin resistance. Chronic stress can compound these effects, as it can both disrupt sleep and be exacerbated by sleep loss.[20] Additionally, stress influences gut permeability, immune activation, inflammation and microbiota disturbance, all of which may contribute to further disturbances in sleep.[20]



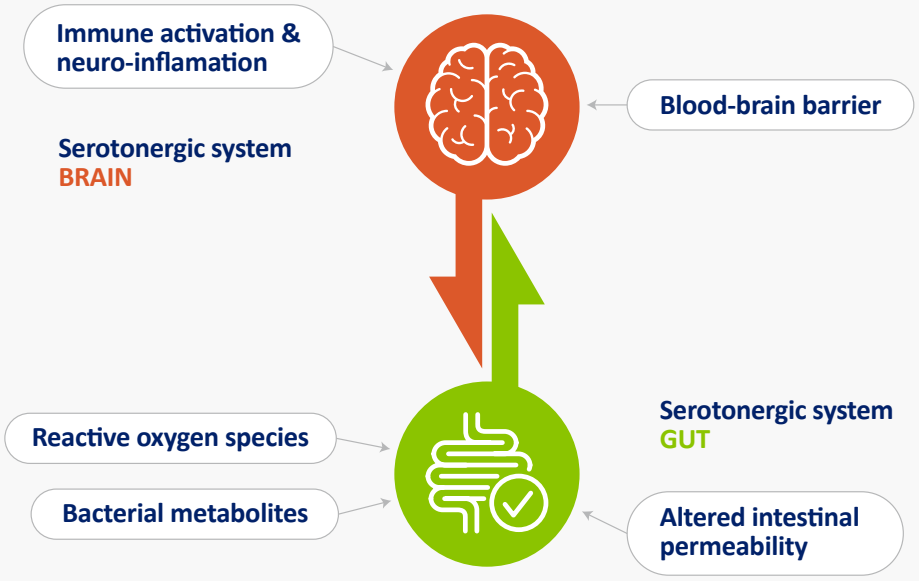
GUT-BRAIN-AXIS AND SLEEP: MECHANISMS OF ACTION

The gut-brain axis regulates sleep through multiple microbiome-influenced pathways:[20]

- **Serotonergic system:** Gut microbiota influence serotonin, a key regulator of sleep architecture that may mediate gut-sleep cross-talk, while also supporting the body's inherent need for microbial harmony.
- **Microbial metabolites:** Sleep fragmentation is associated with changes in the microbiota
- **Vagus nerve:** Enables bidirectional signaling between the gut and brain
- **Immune system:** Links sleep disruption with inflammation and infection susceptibility
- **Blood-brain barrier (BBB):** Gut microbiota can influence BBB permeability
- **Reactive oxygen species (ROS):** Sleep deprivation increases ROS in the gut, potentially driven by microbiome alterations

Together, these mechanisms underscore the central role of the microbiome in sleep regulation and overall physiological balance.

The Sleeping Microbiome-Gut-Brain Axis



Sen et al., (2021) Trends in Molecular Medicine.27:935-945
NREM: Non-rapid eye movement sleep

THE SCIENCE OF SLEEP SUPPORT

Exploratory research suggests that supplementing diet with 20mg of *L. gasseri* CP2305 Postbiotic daily may support:[14,15]

- Better sleep efficiency
- Reduced time to fall asleep/reduced sleep latency
- Healthy overall sleep quality
- Improved total duration of sleep
- Significant improvement in self-reported assessments of mental well-being

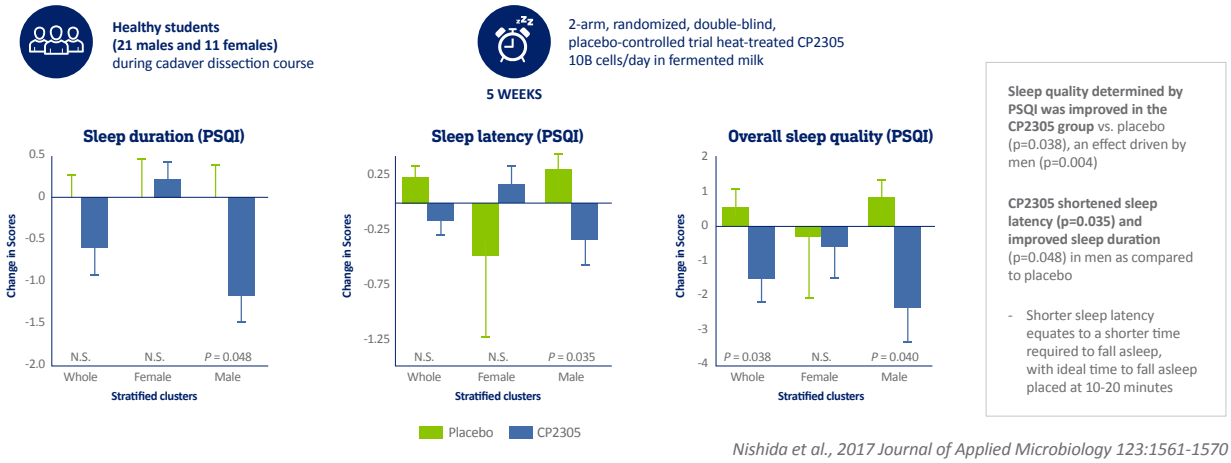
RANDOMIZED CONTROLLED TRIAL (RCT) 1:

In a 5-week study of healthy students (21 male, 11 female) under academic stress, *L. gasseri* CP2305 Postbiotic improved overall sleep quality versus placebo, with the strongest effects observed in men.

- Improved sleep quality (Pittsburgh Sleep Quality Index, PSQI) (p=0.038), an effect driven by men (p=0.004)
- Reduced sleep latency (faster time to fall asleep; p=0.035)
- Improved sleep duration in men (p=0.048)
- Shorter sleep latency reflected improved sleep initiation (ideal: ~10–20 minutes)

2-arm, randomized, double-blind, placebo-controlled trial heat-treated *L. gasseri* CP2305 Postbiotic 20mg/day in fermented milk

Lactobacillus gasseri CP2305 & Sleep Quality



Sleep quality determined by PSQI was improved in the CP2305 group vs. placebo (p=0.038), an effect driven by men (p=0.004)

CP2305 shortened sleep latency (p=0.035) and improved sleep duration (p=0.048) in men as compared to placebo

- Shorter sleep latency equates to a shorter time required to fall asleep, with ideal time to fall asleep placed at 10-20 minutes

Nishida et al., 2017 Journal of Applied Microbiology 123:1561-1570

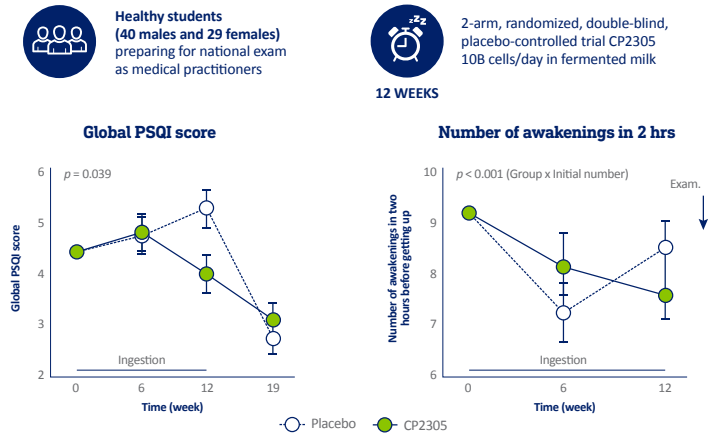
RANDOMIZED CONTROLLED TRIAL (RCT) 2:

In a 12-week study of medical students (40 male, 29 female) under exam stress, *L. gasseri* CP2305 Postbiotic significantly improved sleep quality and duration.

- Preserved perceived sleep quality vs. placebo during stress period (PSQI; p=0.033)**
- Improved sleep duration vs. placebo (PSQI; p=0.029)**, confirmed by electroencephalography (EEG) monitoring
- Sustained assessment over time, with measurements at baseline, 6 weeks and 12 weeks

2-arm, randomized, double-blind, placebo-controlled trial L. gasseri CP2305 Postbiotic 20mg/day in fermented milk
**Pittsburgh Sleep Quality Index (PSQI) is a self-rated questionnaire which assesses sleep quality and disturbances over a 1-month time interval.

Lactobacillus gasseri CP2305 & Sleep Quality



Significant improvement in CP2305 group compared to placebo after 12 weeks in:

Sleep Quality (p=0.033)

- PSQI was again used to determine sleep quality, but this time in Japanese medical students who were studying for a large exam

Sleep Duration (p=0.029) based on PSQI and confirmed by EEG monitoring

- Sleep duration was measured using not only the PSQI, but it was confirmed by using a one-channel sleep electroencephalogram (EEG) monitoring system
- Participants wore the portable EEG for 3 nights a week, occurring prior to the initial ingestion of *L. gasseri* CP2305, and again at both 6 weeks and 12 weeks after consumption began

Nishida et al., 2017 Journal of Functional Foods 36:112-121

RANDOMIZED CONTROLLED TRIAL (RCT) 3:

In a 24-week study of healthy medical students (41 male, 19 female) under prolonged exam stress, *L. gasseri* CP2305 Postbiotic improved mood and sleep disturbances during chronic stress.

- Reduced sleep disturbance (PSQI global score; p=0.041)**
- Shorter sleep latency and reduced wake time after sleep onset
- Increased the delta power ratio in the first sleep cycle (p<0.05), confirmed by electroencephalography (EEG) monitoring

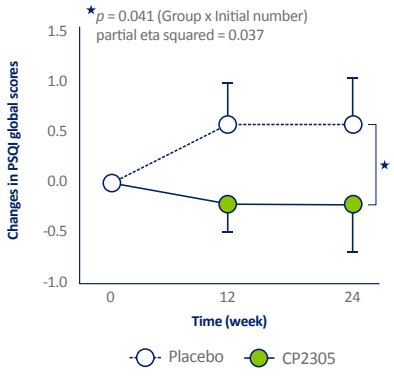
2-arm, randomized, double-blind, placebo-controlled trial heat-treated *L. gasseri* CP2305 Postbiotic capsules 20mg/day
**Pittsburgh Sleep Quality Index (PSQI) is a self-rated questionnaire which assesses sleep quality and disturbances over a 1-month time interval.

Lactobacillus gasseri CP2305 & Sleep Quality

Healthy students
(41 males and 19 females)
preparing for national exam
as medical practitioners

2-arm, randomized, double-blind,
placebo-controlled trial
heat-treated CP2305 capsules
10B cells/day

24 WEEKS



Compared to placebo, CP2305 significantly reduced sleep disturbance (p=0.041) based on PSQI

Compared to placebo, CP2305 significantly shortened sleep latency and wake time after sleep onset and increased the delta power ratio in the first sleep cycle (p<0.05), as measured by EEG

Nishida et al., 2019 Nutrients 11:1859
STAI: Spielberger State-Trait Anxiety Inventory
PSQI: Pittsburgh Sleep Quality Index

Supporting Women From Menstruation to Menopause

Women's health is a dynamic and evolving category, with needs and expectations shifting across life stages and increasingly centered on prevention, personalization and holistic well-being. As women become increasingly aware of the gut-brain connection and its role in supporting both mental and physical health, they are choosing to proactively manage their needs by seeking supplements rooted in long-term wellness.[7]

Women's Motivations Center On:

- Preventing future issues
- Maintaining independence with age
- Supporting mental and emotional well-being
- Seeking solutions that enhance energy and support hormonal balance

THE SCIENCE OF WOMEN'S HEALTH

Clinical data show that 20mg of *L. gasseri* CP2305 Postbiotic daily in healthy young women experiencing premenstrual symptoms may support:[21]

- Positive moods
- Reduced stress/anxiety
- Improved vaginal discharge
- Improved skin appearance
- Reduced occasional constipation

Clinical data show that 20mg of *L. gasseri* CP2305 Postbiotic daily in menopausal women may support:[22]

- Positive changes in physiological and emotional parameters

RANDOMIZED CONTROLLED TRIAL (RCT) 1:

In a study of 56 healthy young women (approximate average age of 21 years) over six menstrual cycles, *L. gasseri* CP2305 Postbiotic was associated with improvements in premenstrual mood and physical symptoms, alongside favorable hormonal changes compared to placebo.

- Greater reductions in depressed mood, anxiety and sleep scores (PMTS-VAS)
- Increased levels of luteal phase progesterone and maintenance of estradiol levels
- Improved physical symptoms, including improved skin appearance and vaginal discharge and a reduction of occasional constipation
- Daily intake might improve premenstrual psychological symptoms in healthy women—an effect associated with changes in hormone levels

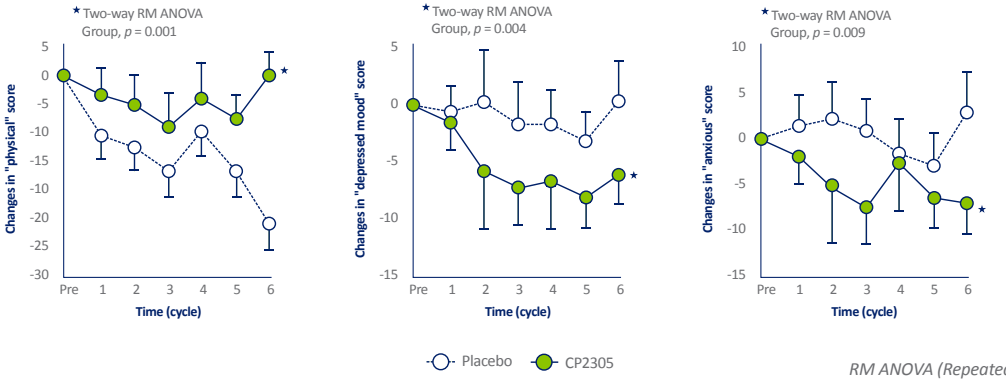
2-arm, randomized, double-blind, placebo-controlled trial *L. gasseri* CP2305 Postbiotic capsules 20mg/day

Lactobacillus gasseri CP2305 & Women's Health

56 women
avg. age 21.5 yr

2-arm, randomized, double-blind, placebo-controlled trial CP2305 capsules 10B cells/day

6 MENTRUAL CYCLES



The CP2305 group reported greater reductions in depressed mood, anxiety, and sleep scores vs. placebo, based on PMTS-VAS

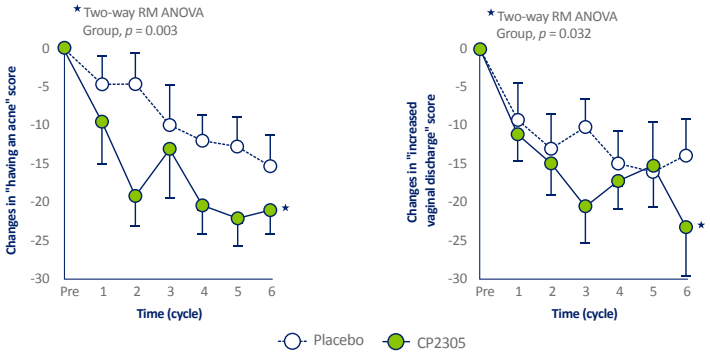
Increased levels of luteal phase progesterone and maintenance of estradiol in CP2305 group vs. placebo

RM ANOVA (Repeated Measure ANOVA, overtime statistical analysis)
Nishida et al., (2021) Journal of Functional Foods 80:104426
PMTS-VAS: PreMenstrual Tension Syndrome-Visual Analog Scale: Ranking from 1-5, as 1 = "never," 2="rarely," 3= "sometimes," 4 = "very

56 women
avg. age 21.5 yr

2-arm, randomized, double-blind, placebo-controlled trial CP2305 capsules 10B cells/day

6 MENTRUAL CYCLES



Constipation, acne and vaginal discharge scores were significantly lower in the CP2305 group vs. placebo

Daily intake of CP2305 tablets might improve premenstrual psychological symptoms in healthy women, an effect associated with changes in hormone levels

RM ANOVA (Repeated Measure ANOVA, overtime statistical analysis)
Nishida et al., (2021) Journal of Functional Foods 80:104426

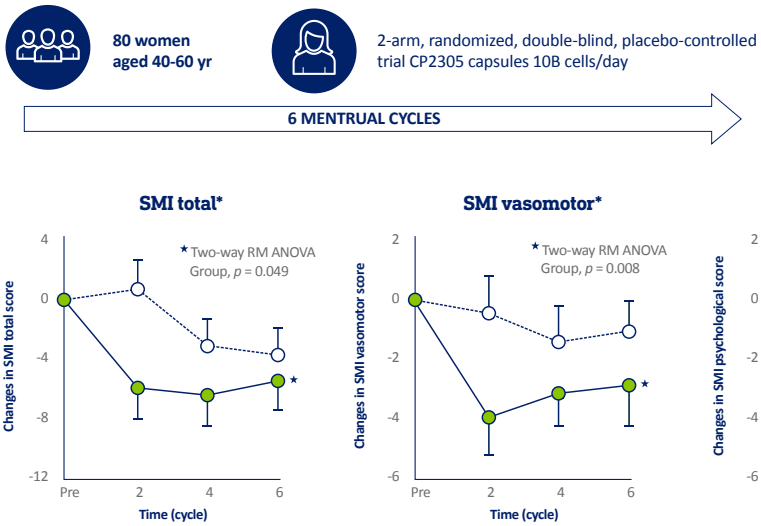
RANDOMIZED CONTROLLED TRIAL (RCT) 2:

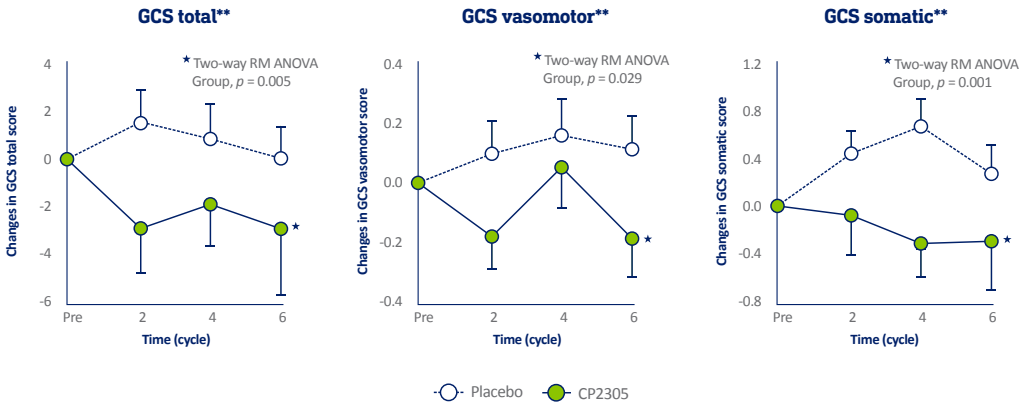
In a study of 80 menopausal women (ages 40–60) over six months, *L. gasseri* CP2305 Postbiotic significantly improved menopausal symptoms compared to placebo, without altering reproductive hormone levels or menstrual cycle duration.

- Decreased psychological and vasomotor symptoms (Simplified Menopausal Index, SMI)
- Decreased somatic and vasomotor symptoms (Greene Climacteric Scale, GCS)
- Safe and well tolerated, with no changes to reproductive hormone levels or menstrual cycle duration

2-arm, randomized, double-blind, placebo-controlled trial *L. gasseri* CP2305 Postbiotic tablets 20mg/day

Lactobacillus gasseri CP2305 & Women's Health





Significant improvement in CP2305 group compared to placebo after intervention period in:

Simplified Menopausal Index (SMI) total score

- Decrease in SMI subscale: psychological and vasomotor scores

Greene Climacteric Scale (GCS) total score

- Decrease in GCS subscale: somatic and vasomotor scores

CP2305 was safe as it did not alter the levels of reproductive hormones nor the menstrual cycle duration

SMI and GCS individual measures

	SMI	GCS
Changes in total score	CP 2305 vs. placebo*	CP 2305 vs. placebo**
Changes in somatic score	–	CP 2305 vs. placebo**
Changes in psychological score	CP 2305 vs. placebo*	–
Changes in vasomotor score	CP 2305 vs. placebo*	CP 2305 vs. placebo**
Changes in sexual score	x	x

Sawada et al., (2022) Nutrients, 14:1695
**SMI: Simplified Menopausal Index*
***GCS: Greene Climacteric Scale*

Supporting Whole-Body Recovery After Exercise

Recovery after exercise has become a key area of focus for consumers, shaping decisions across food, beverage and supplement categories. Increasingly, recovery is viewed as a multidimensional process supported by hydration, targeted nutrition and broader lifestyle routines that integrate exercise, sleep and nutrition.[23]

This holistic approach reflects a growing understanding that effective recovery supports not only physical performance but also psychological well-being. Strong demand exists among younger, active consumers who are more likely to adopt performance-oriented products and routines to optimize both immediate recovery and long-term health outcomes.[24]

28% of consumers have used pre-workout or post-workout supplements in the past 12 months to support muscle recovery or growth.[23]

THE SCIENCE OF RECOVERY AFTER EXERCISE

Clinical studies show that 20mg of *L. gasseri* CP2305 Postbiotic daily may support:[25]

- Reduced levels of stress and occasional fatigue associated with exercise
- Improved recovery from exercise in male athletes
- Improved stress levels in male athletes
- Mitochondrial function

RANDOMIZED CONTROLLED TRIAL (RCT) 1:

In a 12-week study of 49 healthy male runners (ages 18–22), *L. gasseri* CP2305 Postbiotic significantly facilitated recovery from physical fatigue while improving anxiety versus placebo.

- Improved recovery from physical fatigue (Chalder Fatigue Scale, CFS; p=0.047)**
- Improved anxiety (STAI-State p=0.037; STAI-Trait p=0.002; Hospital Anxiety & Depression Scale, HADS-A p=0.019)***
- Improved low mood scores (HADS-D p<0.001)
- Significantly reduced the salivary stress marker, chromogranin A (p<0.001)
- Maintains hemoglobin levels in comparison to placebo training-induced reductions (p=0.004)
- Increased exercise-induced serum growth hormone (GH) levels (p=0.047)****
- Significantly increased the alpha- and beta-diversities of fecal microbiota from baseline (p<0.05)
- Increased the levels of *Faecalibacterium*, which is known to express anti-inflammatory properties, and prevented the reduction of *Bifidobacterium*
- Reduced the stress-induced changes in the expression of genes related to mitochondrial functions

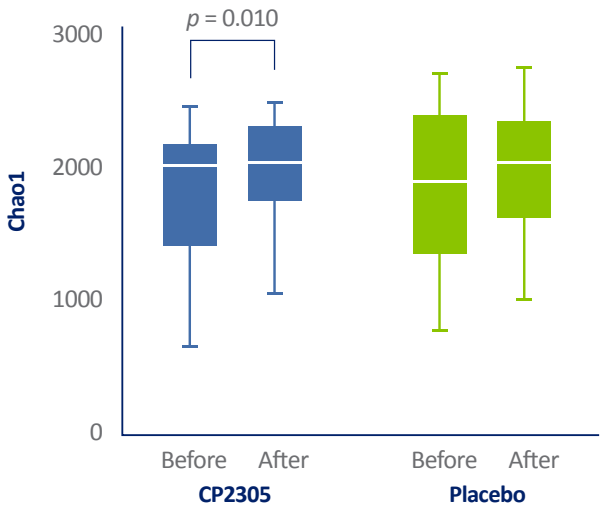
2-arm, randomized, double-blind, placebo-controlled trial heat-treated *L. gasseri* CP2305 Postbiotic 20mg/day in 200mL sports drink
** Chalder Fatigue Scale (CFS) is a validated self-report questionnaire used to assess fatigue severity. Lower scores reflect lower perceived physical fatigue.
***Hospital Anxiety & Depression Scale (HADS)
****Growth Hormone (GH) is a key physiological regulator involved in exercise recovery and its circulating levels are sensitive to physical and psychological stress.

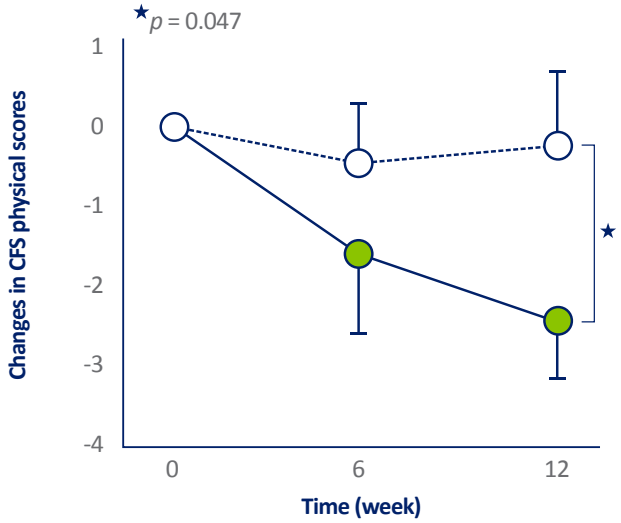
Lactobacillus gasseri CP2305 & Recovery After Exercise

49 healthy male runners (18-22 yr)

2-arm, randomized, double-blind, placebo-controlled trial heat-treated CP2305 10B cells/day in 200mL sports drink

12 WEEKS





Sawada et al., 2019 Journal of Functional Foods 57:465-476
**Xiaoya He, Shuyang Zhao, Yan Lin, Fae calibacterium prausnitzii: A Next-Generation Probiotic in Gut Disease Improvement, Canadian Journal of Infectious Diseases and Medical Microbiology, Volume 2021, Issue 1*

CP2305 intake significantly increased the alpha- and beta-diversities of fecal microbiota from baseline ($p<0.05$), and increased the levels of Faecalibacterium and prevented the reduction of Bifidobacterium vs. placebo.

- Alpha-diversity is the richness or evenness of bacterial taxa seen in an average sample within a given group, while beta-diversity is the variability in the community composition among samples within a population
- Increased levels of Faecalibacterium may be beneficial as this bacterium is known to express anti-inflammatory properties

CP2305 prevented the stress-induced changes in the expression of genes related to mitochondrial functions.

- When under stress, the expression of genes related to mitochondrial function can significantly change, often leading to an upregulation of genes involved in stress responses pathways, like antioxidant defense mechanisms, while downregulating genes responsible for normal mitochondrial respiration, potentially impacting cellular energy production

The Postbiotic Advantage: Stability Meets Versatility

L. gasseri CP2305 Postbiotic delivers exceptional formulation stability, positioning it as one of the most versatile and well-documented ingredients for mental and emotional wellness. Unlike live microbial solutions, its non-viable nature supports consistent performance across a wide range of processing and storage conditions. This stability supports innovative product development without compromising efficacy—enabling seamless integration into diverse applications, including:

- **Dietary supplements**
- **Functional foods**
- **Powdered beverage formulations**

COMPOSITION

Lactobacillus gasseri CP2305 Postbiotic

CONCENTRATION

500B CFU equiv./g
100B CFU equiv./g

DAILY DOSE

20mg/day

CERTIFICATIONS

Non-GMO
Gluten free
Halal certified

From Lab to Life: ADM Microbiome Solutions

ADM drives innovation. From the science behind the ingredients to real-world applications in food, beverage and dietary supplements, ADM delivers future-forward nutrition fueled by science, with a complete range of solutions from pre-, pro- and postbiotics to bacteriophages and enzymes, all clinically documented to deliver health and wellness benefits.

ADM Delivers for You

ADM maintains an expansive pantry of health and wellness ingredients to deliver science-driven supplements and food and beverage formulations to meet consumers' evolving functional nutrition needs. Our vertically integrated supply chain ensures the reliability and availability of high-quality products while our dependable customer service provides industry-leading solutions to support your success.

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