

From Microbes to Mind

Optimizing The Gut-Brain Axis

- Understanding the Science
- Signs and Symptoms
- Functional Lab Tests
- Personalized Supplement Plan

The gut-brain connection is vital to maintaining overall health and wellbeing. This protocol is designed to be personalized to optimize the gut-brain axis to support overall health and quality of life.[†]

The Remarkable Gut and Brain Connection

UNDERSTANDING HOW IT WORKS

The gut-brain axis is a bidirectional communication system connecting the central nervous system (CNS) and the enteric nervous system (ENS), which regulates the production and integration of neuroactive and inflammatory chemicals through a complex network of neural, hormonal, and immunological signals that travel between the gut and the brain. This occurs through the following mechanisms:

Step 5:

The gut microbiota can profoundly influence both central and peripheral nervous systems through several mechanisms, including supporting the tight junction barrier function, producing cytokines, modulating inflammation, and producing serotonin.

Step 1:

Sensory neurons located in the gut detect changes in the gut environment and send signals to the enteric nervous system.

Step 4:

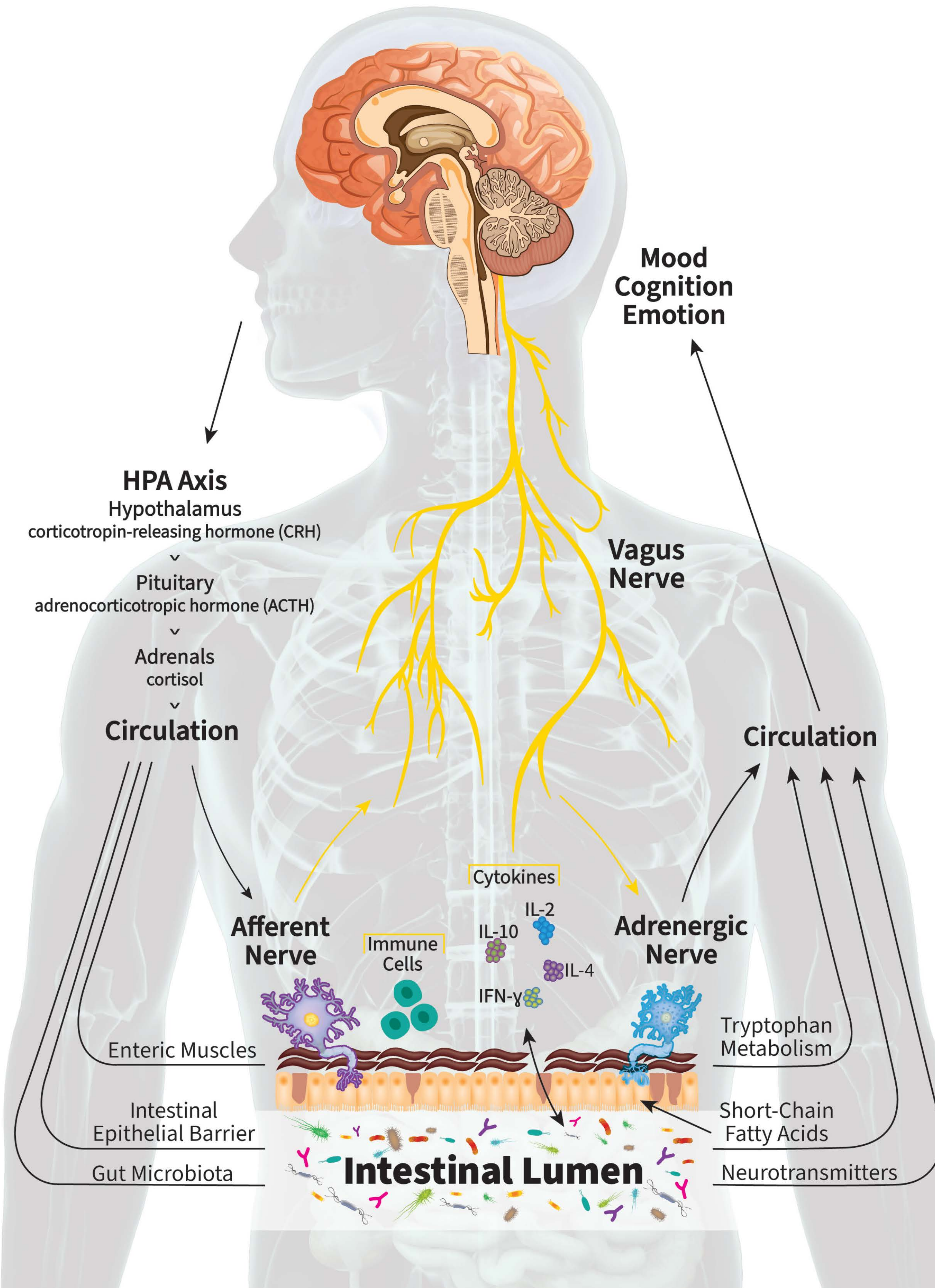
Hormones produced by gut cells can enter the bloodstream and affect physiological functions such as appetite and mood, influencing overall homeostasis.

Step 2:

The enteric nervous system then processes sensory information and generates local reflexes that can modulate gut motility, secretion, and blood flow.

Step 3:

The enteric nervous system communicates with the central nervous system via the vagus nerve, providing a direct pathway for gut-brain signaling.



**Mood
Cognition
Emotion**

HPA Axis

Hypothalamus
corticotropin-releasing hormone (CRH)
▼
Pituitary
adrenocorticotrophic hormone (ACTH)
▼
Adrenals
cortisol
▼

**Vagus
Nerve**

Circulation

Circulation

Cytokines

IL-2
IL-10
IFN- γ
IL-4

**Immune
Cells**

**Adrenergic
Nerve**

**Afferent
Nerve**

**Tryptophan
Metabolism**

**Enteric
Muscles**

**Short-Chain
Fatty Acids**

**Intestinal
Epithelial
Barrier**

Neurotransmitters

**Gut
Microbiota**

**Intestinal
Lumen**

Signs of Gut-Brain Imbalance

WHAT YOU NEED TO KNOW

Dysregulation of the gut-brain axis has been linked to various disorders, including functional gastrointestinal disorders, mood disorders, and autoimmune disorders.^{1,2} Here are some common signs and symptoms of gut-brain axis dysfunction:

Autoimmune Disorders

There is emerging evidence that dysregulation of the gut-brain axis may contribute to the development of autoimmune disorders such as rheumatoid arthritis and multiple sclerosis.^{3,4}

Impaired Cognitive Functions

Gut-brain axis issues often present as problems with mental clarity, alertness, memory, stress response, mood, sleep, and focus.⁵

Digestive Problems

Dysregulation of the gut-brain axis has been associated with various gastrointestinal symptoms, including abdominal pain, bloating, diarrhea, constipation, IBS, and gastroesophageal reflux disease (GERD), all of which are associated with leaky gut.^{6,7}

Fatigue

Chronic fatigue syndrome (CFS) is a condition characterized by persistent fatigue that is not alleviated by rest and is often accompanied by cognitive impairment, headaches, and other symptoms. Studies suggest that gut-brain axis dysfunction may play a role in the development of CFS.⁸

Food Craving

There is evidence that gut microbiota can influence food intake by regulating satiety signals and modulating reward pathways in the brain. Thus, dysregulation of gut-brain signaling may contribute to the development of food cravings and compulsive eating behaviors.⁹

Mood Disorders

Studies have shown a correlation between gut-brain axis dysfunction and mood disorders such as anxiety, depression, mood swings, and irritability.^{10,11} New research has also shown a correlation with other major mood disorders such as schizophrenia.¹²

Skin Disorders

Gut-brain axis dysfunction has been linked to the development of various skin disorders, including acne, rosacea, and atopic dermatitis.¹³

Weight Gain

There is evidence that alterations in gut microbiota and gut-brain signaling may contribute to the development of obesity and metabolic syndrome.¹⁴

SYMPTOMS

Diagnostic Biomarkers[△]

HOW TO ASSESS

Precision medicine involves utilizing functional lab tests to inform treatment decisions. In the context of evaluating the gut-brain axis, several assessments are available. However, the selection of specific tests should be guided by the patient's health needs and clinical presentation. Conducting all tests listed may not be necessary; additional testing may be needed depending on the individual case. Those offered below are intended to serve solely as a reference for implementing a testing strategy.

Comprehensive Stool Test

Evaluating dysbiosis and digestive health is imperative for developing a healthy microbiome that can promote a balanced mood via the gut-brain connection. Comprehensive stool tests provide a thorough picture of gut health by detecting pathogens and assessing digestion, nutritional absorption, inflammation, and immune function, all of which influence the gut-brain axis.

Omega Index

Many studies link essential fatty acids to brain development, mood, and behavior. Additionally, reduced omega-3 levels have been shown to influence the brain's dopaminergic regions.¹⁵ Omega-3 fatty acids protect against neurological injuries via BDNF signaling pathways.¹⁶ Omega-3 fatty acids are also being researched for their role in serotonergic signaling.¹⁷ Finally, healthy omega levels have been connected to microbial diversity and have a role in controlling inflammation that affects mental health.¹⁸⁻²¹ Monitoring fatty acids, Omega-3 & 6, and the Omega-3 Index can help guide dietary consumption and whether additional supplementation is required.

Micronutrient Test

Micronutrient deficiency can affect mental health and mood by impairing the production of neurotransmitters in the brain and stomach. Micronutrients function as cofactors in enzyme reactions that produce amino acids, which are essential building blocks of neurotransmitters. For example, B-vitamins, including B12, are important for stress response, mood regulation, memory improvement, and maintaining balance between neurotropic and neurotoxic factors in the central nervous system.²²

Homocysteine (tHcy)

Testing homocysteine levels can be useful when addressing the gut-brain axis because elevated homocysteine levels may indicate suboptimal levels of certain B-vitamins, which can impact the gut-brain axis. These vitamins, including B6, B12, and folate, are involved in the production of neurotransmitters and have been linked to gut health and the prevention of neurodegenerative diseases. By addressing vitamin deficiencies indicated by homocysteine levels, gut-brain axis health may be improved, leading to better overall health outcomes.

Hormone Test

This test will measure cortisol which is the primary stress hormone and give an assessment of inflammation, sleep, and mood regulation in the body. It also measures sex and adrenal hormones such as testosterone and estrogen. It should also include the daily free cortisol pattern, organic acids, melatonin (6-OHMS), and 8-OHdG.

Neurotransmitter Test

Neurotransmitters are chemical groups that include amines, amino acids, organic acids, and others. This test can be useful in addressing the gut-brain axis because the two-way connection between the digestive tract and the brain can impact mood. Regulating neurotransmitter levels and ensuring an adequate supply can influence the gut via the vagus nerve and have a positive impact on both the brain and the gut.

Food Sensitivity Test

Measuring IgA and IgG immunoglobulins released by the immune system can provide valuable information on food sensitivities and intolerances, which potentially affect the gut-brain axis. If indicated, assessing for gluten sensitivity and celiac disease can provide additional information on gut health.

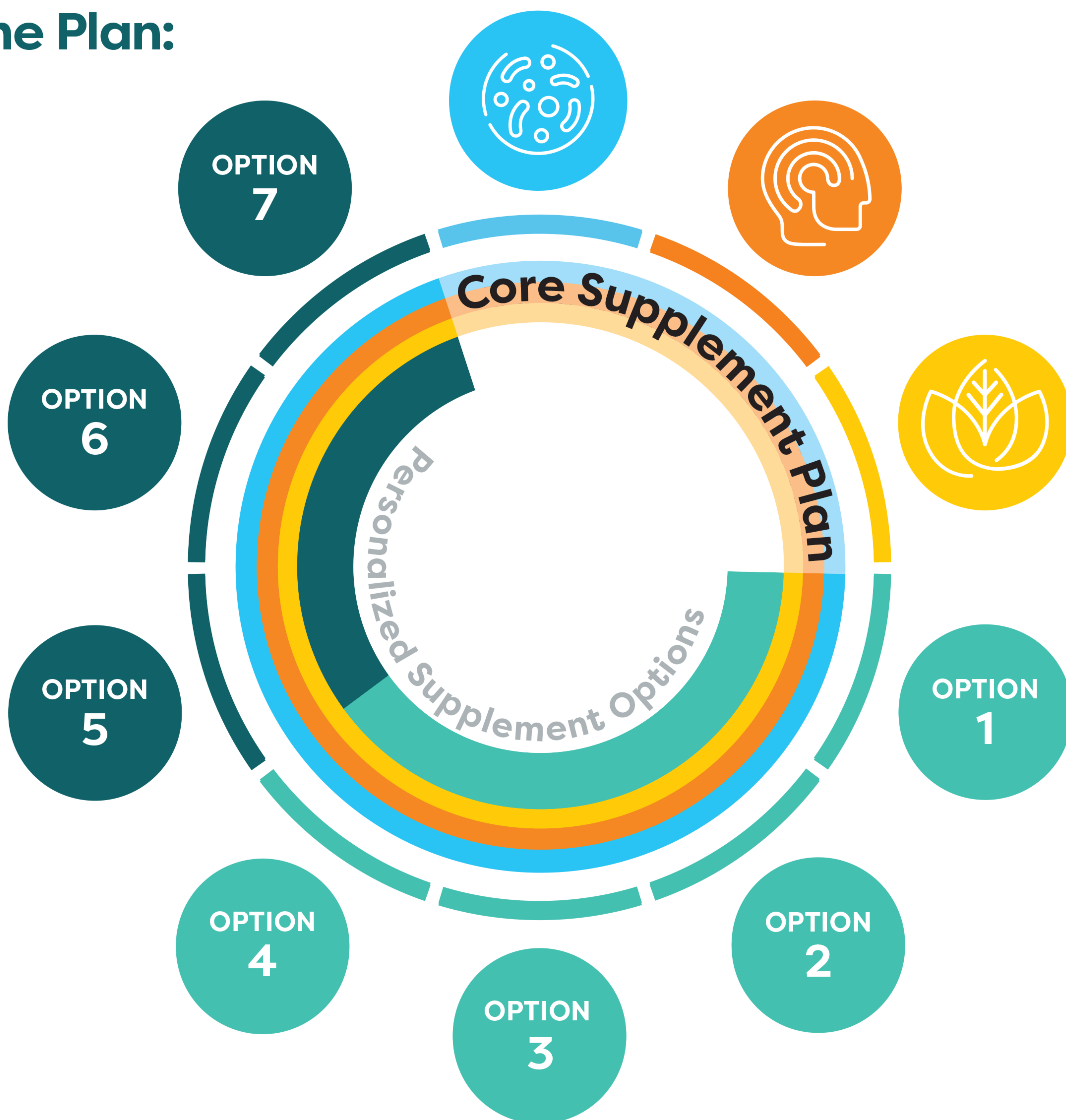
STRAIN ENZYME MINI S S E S S A

Optimizing the Gut-Brain Axis[†]

HOW TO ADDRESS

Healthy functioning of the gut-brain connection is essential for the maintenance of general health and overall wellbeing. To foster this connection, it is critical to establish a solid base of nutritional practices. This personalized protocol provides extensive guidance on targeted supplementation, which promotes the cultivation of healthy microflora, a harmonized stress response, and healthy hypothalamic-pituitary-adrenal (HPA) axis function.[†] By utilizing this protocol, individuals are supporting gut-brain axis function, promoting overall health and enhancing quality of life.[†]

The Plan:



Protocol Overview

This protocol is designed to be customized by a healthcare practitioner based on the patient's health needs. The protocol begins with the Core Supplement Plan in month one, followed by the addition of selected supplements in month two and month three.



Month 1-3

Target gb-X™

Healthy Barrier Function†

Target gb-X™ with Ecologic BARRIER was specifically designed to influence the gut-brain axis through defined mechanisms including strengthening of the gut barrier function, modulation of cytokines and inflammatory response, production of potentially neuroprotective metabolites, and HPA regulation. The probiotic strains in Target gb-X™ have been specifically selected for their pronounced synergistic influence on the gut-brain axis as demonstrated by both human and animal studies. Ecologic BARRIER, a 5 billion CFU probiotic blend, is the first probiotic formula clinically shown to support a healthy mood.†

(SKU# GBX) *Serving Suggestion* 1 sachet daily on an empty stomach.*

Cortisol Management

Healthy Stress Response†

Cortisol Management combines two patented stress management ingredients, Relora® and Sensoril®. Relora® is a blend of botanical extracts traditionally used to support healthy stress response and control stress-related eating.† Sensoril® is a proprietary Ashwagandha extract that helps the body cope with stress and promote relaxation, without causing drowsiness.†

(SKU# CP7380) *Serving Suggestion* 1 capsule, 3 times daily with food.*

Eicosamax® 1000

Healthy Cellular Function†

A once-daily 1,000 mg of omega-3 EPA and DHA from fish oil to support a balanced inflammatory response, healthy triglyceride metabolism, and your heart, joint, skin, brain, and nerve function.† Additionally, omega-3 fatty acids have been shown to increase the diversity of healthy gut bacteria, decrease gut permeability, and lower inflammation, which means good things not just for your gut, but for your overall health.†

(SKU# EMXXS) *Serving Suggestion* 1 soft gel daily with food.*

Personalized Supplement Options

Choose one or more to add to the Core Supplement Plan

MONTH

2

Personalized Options

OPTION 1

OPTION 2

OPTION 3

OPTION 4

Month 2

Brain Vibrance Supreme™ Powder

Support for mental focus and acuity†

This powerful trio of essential brain nutrients promotes mental clarity, enhances working memory, improves nervous system processing speed and accuracy, and supports cell membrane health.† (SKU# CR10192)
Serving Suggestion 1 level scoop mixed in a beverage, 1 or 2 times daily.*

Methyl Balance™

Support for physical energy and stamina†

This product combines bioactive forms of four essential B vitamins with trimethylglycine (betaine). B vitamins are important for methylation, a process that is necessary for maintaining cellular health, producing hormones and neurotransmitters, and metabolizing energy. Studies have shown that maintaining optimal levels of B vitamins is associated with better neurological and psychological health.† (SKU# MBA)
Serving Suggestion 1 capsule daily with food.*

Acumen®

Cognitive function support for memory retention and recall†

CDRI 08® whole-plant Bacopa monnieri extract has been clinically shown to enhance cognitive function, working memory, and stress management, while supporting a positive mood.† This neuroprotective and adaptogenic herb has been used for centuries to improve mental sharpness and memory by shielding the brain against oxidative stress and promoting chemical communication between brain cells.† This product has been clinically shown to support working memory, cognitive function, and healthy stress response.† (SKU# ACU) *Serving Suggestion* 1 to 2 capsules daily with food.*

Stress Support Complex

Support for restful and restorative sleep†

Stress Support Complex is a powerful blend of sleep-promoting botanicals along with L-Theanine and GABA (gamma-aminobutyric acid), two neurotransmitters that promote relaxation.† Together, these provide your body with the building blocks it needs to promote healthy stress responses and restful sleep.† (SKU# CP1660) *Serving Suggestion* For occasional stress or tension: 2 capsules 2 times daily.* For sleep support: 4 capsules at bedtime.*

* Usage may be adjusted to individual needs or as directed by a healthcare professional.

Month 3

Magnesium Citrate

Support for positive mood and emotional wellbeing†

Magnesium citrate is a readily soluble form of magnesium that can cross the blood brain barrier. Magnesium is an essential mineral needed for more than 300 biochemical reactions in the body. Magnesium supplementation supports relaxation by promoting healthy neurotransmitter levels and cell signaling, supporting healthy stress hormone levels, and promoting healthy sleep patterns.† (SKU# V433-09)

Serving Suggestion 1 capsule, 1 to 3 times daily.*

Dual Detox™

Support for natural detoxification processes†

Dual Detox™ is an advanced blend of green plant concentrates and enzymes for protection against chemical exposures from your daily diet and the environment.† It binds intestinal toxins and supports natural liver detoxifying effects.† Dual Detox™ can be used as an adjunct to short-term detoxification programs or for daily support of the body's natural detoxification mechanisms, promoting a healthy internal environment.† (SKU# DTX)

Serving Suggestion 2 capsules, 2 times daily with food.*

MitoThera™

Support for healthy cellular longevity†

The mitochondria, also known as the powerhouse of the cell, give the brain, liver, heart, muscles, endocrine glands, and other tissues the energy they need to work. There are many things that can affect how well the mitochondria work, including exposure to toxins, not getting enough antioxidants, illness, genetics, and a decline in cellular function with age. These can lead to oxidative damage, altering cellular function.

MitoThera™ provides important nutrients and energy substrates that protect against free radicals and help mitochondria do their important jobs better.† (SKU# MTOC)

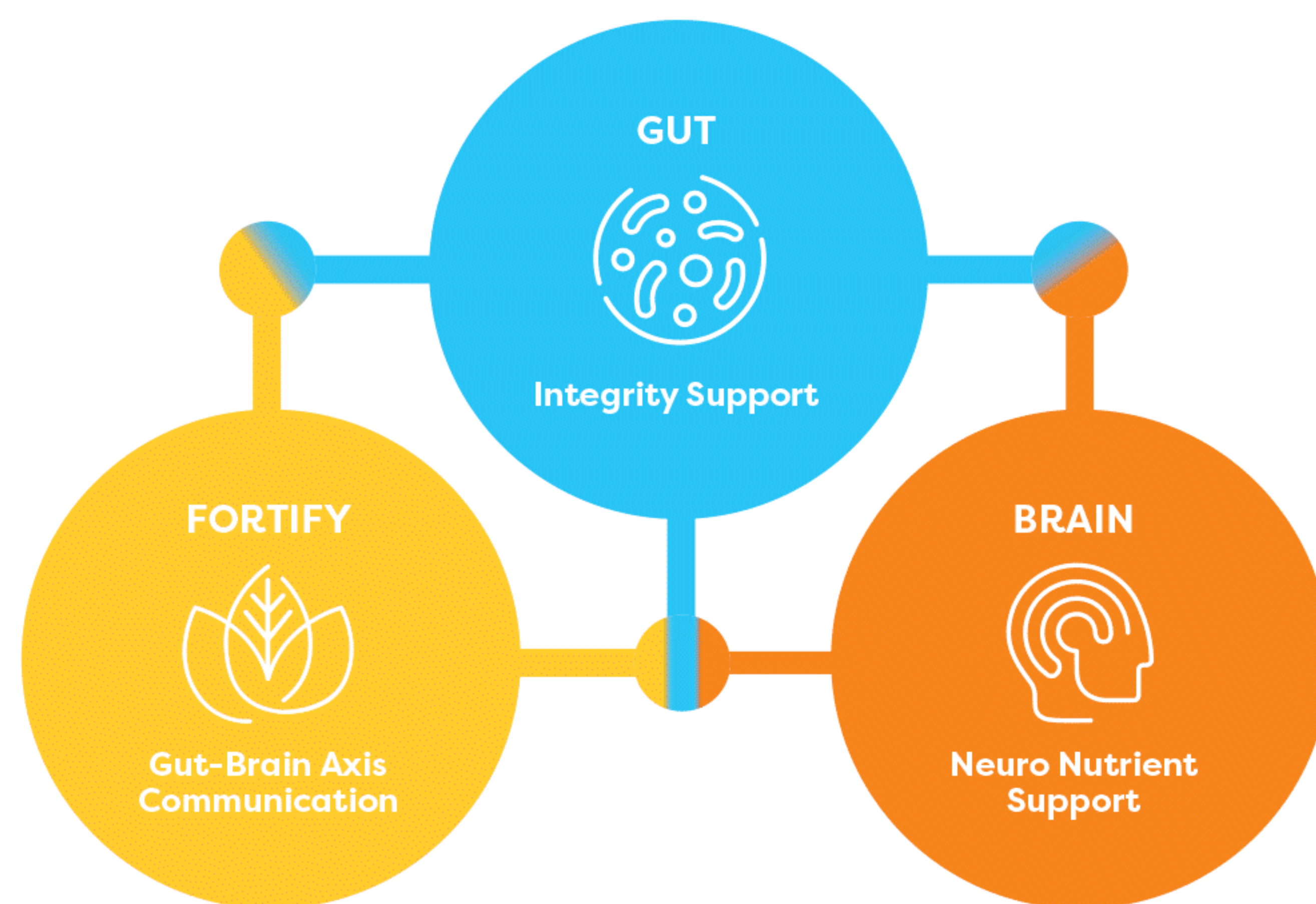
Serving Suggestion 4 capsules daily with food.*



The Power of Three

A close and remarkable connection exists between the gut and the brain. This bi-directional communication network controls the generation and assimilation of neuroactive chemicals, modulation of inflammation, and interaction with the vagus nerve which is heavily influenced by the gut microbiota.

The healthy functioning of the gut-brain axis (GBA) is essential for the maintenance of overall wellbeing. Several reports indicate that the gut-brain axis can be influenced by supporting healthy intestinal barrier function, stress response, and cellular function. Our Core Protocol Products have been strategically selected by our Medical Team to provide these primary support functions.†



Doctor Approved GBA Dream Team

CORE PROTOCOL

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Serving suggestions are given for typical use based on an average 150-pound healthy adult. Healthcare practitioners are encouraged to use clinical judgment with case-specific serving sizes based on intended goals, subject body weight, medical history, and concomitant medication and supplement usage. Any product containing botanical substances has the potential for causing individual sensitivities, appropriate monitoring, including liver function tests (LFT) is recommended.

† These statements have not been evaluated by the Food and Drug Administration. These products are not intended to diagnose, treat, cure, or prevent any disease.

SFI Health™ is a global leader developing premium integrative health solutions for the microbiome and cognition - the two interconnected systems that get at the heart of human health.

Fueled by a collective belief that nature's healing powers should be accessible to all, SFI Health™ shares world-class research, expertise and specialist capabilities to support consumers and healthcare professionals, and partner businesses in bringing quality products to life.

