



Precision Medicine: Lab Selection for Complex Gut-Brain Axis Issues

Diagnostic tests are a vital part of any practitioner's protocol. A carefully curated set of labs can provide valuable information, pinpoint specific areas of dysfunction or imbalance, direct intervention and guide practitioners in personalized therapeutic approaches. That's especially important for intricate gut-brain issues that can't be effectively addressed from a one-size-fits-all perspective.

"It's not just a matter of eliminating gluten or taking probiotics," says James Greenblatt, MD, founder of Psychiatry Redefined. "The gut-brain connection is complex, and patients' challenges come in complex forms. With labs, you're not guessing. Lab tests direct practitioners toward personalized treatment options, and the potential for success is just much higher."

Creating a comprehensive picture of a patients' Gut-Brain Axis (GBA) without ordering a battery of tests requires a skillful, targeted approach. Here's an overview of some of the most vital tests, and how results inform personalized treatment plans.

Micronutrient Panel

- **What it is, and why to use it.** Micronutrient tests assess the status of nutrients involved in brain health, neurotransmitter production and cognitive function, and can also point to gut and absorption issues. The Micronutrient Panel provides a complete and accurate picture of a patient's micronutrient status by testing not just the extracellular compartment, but also the intracellular compartment.
- **What to look for.** Patterns or trends in deficiencies and/or excess levels of nutrient groups—such as fatty acids, amino acids and B vitamins—that have been linked with brain health and functioning. Additionally, micronutrient deficiencies may suggest digestion and absorption issues and can indicate gut problems.
- **How results inform personalized treatment options.** Depending on the compartment affected (extracellular vs. intracellular), nutrient deficiencies or toxicities may need to be approached differently. The test helps guide practitioners on intervention options and can suggest whether a deeper dive is warranted for nutrient status discrepancies.

Neurotransmitters Test

- **What it is, and why to use it.** a neurotransmitters test is a urine-based test that measures individual neurotransmitter levels, key neurotransmitter ratios, diurnal epinephrine and norepinephrine ratios, as well as precursor amino acids and neurotransmitter pathway intermediates and metabolites. Since the GBA is bidirectional, neurotransmitter abnormalities may worsen gastrointestinal pathologies and gastrointestinal pathologies may worsen neurotransmitter abnormalities and pathologies.
- **What to look for.** Abnormalities in neurotransmitter pathway metabolites can profoundly affect mood, memory and cognition, as well as gut function. Practitioners should assess neurotransmitter pathways for abnormalities in inhibitory neurotransmitters that act as the brakes or off-switch by decreasing/inhibiting action potentials (GABA, serotonin, glycine, taurine) and excitatory neurotransmitters (glutamate, epinephrine, norepinephrine, dopamine, acetylcholine) that act as the accelerator or on-switch by firing off action potentials.
- **How results inform personalized treatment options.** Interventions for neurotransmitter-related dysfunction are often guided by a general diagnosis and treated empirically in a trial-and-error approach. The neurotransmitters test can provide clinically useful data to direct treatment of neurological and behavioral health conditions, and to monitor and evaluate efficacy of interventions.

Food Sensitivity Tests

- **What it is, and why to use it.** These tests measure specific proteins released by the immune system (IgA and IgG) and can provide information about both short-term responses (24-48 hours with IgA) and longer responses (48-72 hrs. with IgG). They're best measured together because they provide better information about food sensitivities and intolerances (vs. allergies) and give you a clue as to the reason behind the sensitivity. The testing reports enable practitioners to pinpoint which foods may drive a patient's gut dysfunction and contribute to behavioral symptoms such as anxiety, mood swings, and other conditions.
- **What to look for.** Food-based immune activation can trigger gut and systemic inflammation and can lead to degradation of the gut lining ("leaky gut"). Brain fog, anxiety and other mood disorders are associated with inflammation and leaky gut. IgG and IgA tests typically evaluate food antigens, and test results include a reference range of antibody responses, from highly elevated, to intermediate, to low levels. An elimination diet can be designed based on the level of antibodies produced by foods.

- **How results inform personalized treatment options.** IgG and IgA testing helps practitioners pinpoint which foods are driving symptoms so they can tailor individualized nutrition and lifestyle plans for their patients.

Homocysteine Test

- **What it is, and why to use it.** The Homocysteine Test measures levels of homocysteine, commonly used to assess risk for cardiovascular disease and stroke. High homocysteine levels are also linked with a range of health issues and may play a role in the GBA. Elevated homocysteine levels are associated with declining cognitive function and dementia, Alzheimer's disease and age-related memory impairment. Elevated levels of homocysteine may also promote intestinal inflammation and impact digestive function, and some research links elevated homocysteine with an increased risk of digestive tract cancer.
- **What to look for.** A homocysteine test uses a reference range to indicate low-, borderline- and high-risk homocysteine levels. Elevated homocysteine levels are known to promote oxidative stress and vascular endothelial damage, and these effects are associated with wide-ranging systemic conditions, including neurological harm and gut issues. Extremely low results are not entirely desirable; homocysteine plays a role in various physiological processes decreased levels are associated with peripheral neuropathy and other health conditions.
- **How results inform personalized treatment options.** In many cases, elevated homocysteine levels are a call to action to identify nutrient deficiencies such as B6, B12 and folate, to inform personalized supplementation approaches. Further evaluation of relevant genetic SNPs known to affect homocysteine metabolism may be useful. Patients with elevated homocysteine levels may be evaluated for oxidative stress and vascular lifestyle support as well.

Organic Acid and Amino Acid Testing

- **What it is, and why to use it.** The organic acid and amino acid test evaluates urine and plasma metabolites—including organic acids, amino acids and other key compounds—to assist practitioners in unraveling their patient's metabolic pathways. This test can typically be run as a blood/urine combination or by urine only. The urine sample should be a first-morning void. Results help practitioners identify dysfunctional metabolic pathways that may negatively impact mood and metabolic perturbations related to stress and mood, blood sugar dysregulation, nutrition, aging and others. Practitioners can use this type of test to establish a patient's baseline metabolic signature and tailor treatment for patients with metabolic dysfunction.

- **What to look for.** The test measures the neurotransmitter GABA, catecholamine turnover, serotonin turnover, cortisol, cortisone and aldosterone to provide insights into stress and mood disorders. This type of test can also help identify neuroinflammation and includes metabolites such as quinolinic acid.
- **How results inform personalized treatment options.** Results from this type of test highlight areas of metabolic dysfunction that can be addressed through supplementation, diet and lifestyle.

Fatty Acids: Omega-3 & 6

- **What it is, and why to use it.** The omega fatty acids test measures fatty acid levels in the blood and calculates a ratio of omega-3 to omega-6 fatty acids. Because brain cells and their insulation are composed of omega-3 and omega-6 fatty acids, an imbalance may impact brain health and could indicate gut dysbiosis.
- **What to look for.** Low omega-3 and high omega-6 status is associated with decreased brain performance, neurological conditions, inflammation, mood disorders and cognitive impairment. Additionally, a lower ratio of omega-6 to omega-3 beneficially alters gut microbiota, lessening the production of harmful bacteria while increasing beneficial bacteria. Practitioners should look for fatty acids out of the reference range, especially high levels of omega-6 or low omega-3 levels.
- **How results inform personalized treatment options.** A relative measure of omega-3 to omega-6 fatty acids helps providers focus on which fatty acid(s) need to be altered by diet and/or supplementation.

Comprehensive Stool Test

- **What it is, and why to use it.** The comprehensive stool test typically uses quantitative polymerase chain reaction (qPCR) technology to detect parasites, bacteria, fungi, viruses and more by targeting the specific DNA of the organisms tested. The test's technology can assess how much of an organism's DNA is present in a patient's stool sample to help practitioners to determine the clinical significance of organisms present. The results can help practitioners find the root cause of underlying gastrointestinal and extraintestinal symptoms. It is an essential tool for helping patients suffering from chronic conditions including mood disorders, IBS/IBD, parasites, H. pylori, autoimmune disease dysbiosis, and more.
- **What to look for.** The test detects microbes that may be disrupting microbial balance or contributing to illness. The comprehensive stool test can also report on key indicators of gut health, including digestion, absorption, inflammation and

immune function. If the GBA is not functioning properly, neurotransmitters, hormones, and central nervous system signals crucial for optimal mental health may be affected. Gut health testing may help uncover underlying causes of mood disorders, including anxiety, depression, brain fog and others.

- **How results inform personalized treatment options.** Practitioners can use this type of test to assess microbial balance and gastrointestinal health to find the root causes of chronic conditions. Results can guide personalized gut-healing protocols.

Genetic Testing

While some lab tests offer meaningful and useful data points and suggest a course of action, those tests don't necessarily stand alone. Instead, practitioners should consider individual tests part of a comprehensive package that starts with genetic testing.

Used properly, a genetic test isn't an absolute answer. It's a starting point, a screening tool that can streamline the diagnostic process, suggest other tests and guide therapeutic protocol in an efficient, productive way. Learn more about [Genetic SNPs](#) that can directly impact the GBA.

Practitioner Protocol: Optimizing the Gut-Brain Axis

[This Protocol](#) is designed to be personalized by healthcare practitioners to help optimize the gut-brain axis connection. † It includes an overview of the GBA, signs of GBA dysfunction, diagnostic biomarkers to consider, and a 3-month strategic supplementation plan. By adhering to this approach, individuals can enhance their gut-brain health, resulting in an improvement in overall health and quality of life.†

†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.