Urinary Neurotransmitter Testing: A Powerful Tool for Assessing Nervous System Function

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Neurotransmitters are traditionally described as brain chemicals that act as messengers in the body, relaying signals between neurons. Neurotransmitter levels in the urine are derived from a variety of sources including the CNS, PNS and the immune system. As such, they’re incredibly powerful. Present throughout the body, neurotransmitters are required for proper brain and body functions and regulate numerous physical and emotional processes, such as mental performance, emotional states and pain response. They are responsible for mood, pain and pleasure sensations and control the quality of sleep, appetite and energy levels, and sex drive.

Psychological challenges, including emotional, traumatic and mental stressors, primarily stimulate the nervous system and cause variations in neurotransmitter levels. The autonomic nervous system translates stressor signals to activate the immune and endocrine systems. Therefore, the nervous system creates imbalances in the immune and endocrine systems when exposed to psychological challenges. This is seen clinically when people under stress develop rashes or become more susceptible to illness.

So just as it is common practice to test a diabetic’s blood sugar before administering insulin, it is useful to test neurotransmitters as an objective means for assessing nervous system function and its attendant symptoms relating to mood, sleep, and cognition. Assessing neurotransmitter levels identifies an individual’s specific imbalances, objectively establishes the need for intervention, guides therapeutic decisions and quantitatively monitors intervention effectiveness.

There are several ways to measure neurotransmitters, including through urine, blood and cerebral spinal fluid (CSF). For many clinicians, the preferred assessment is urinary, due to the fact that it is non-invasive and more stable compared to CSF or blood.

More importantly, the current body of literature provides evidence that neurotransmitters excreted in the urine may effectively
serve as biomarkers of nervous system function. Studies have demonstrated that intact neurotransmitters are transported from the central nervous system to the periphery, followed by renal filtration of neurotransmitters and excretion in the urine.  

A recent peer-reviewed publication on urinary neurotransmitter testing, published by a team including NeuroScience CEO and founder Dr. Gottfried Kellermann, found good correlation between urinary serotonin levels measured by ELISA and liquid chromatography tandem mass spectrometry. Additionally, serotonin levels in depressed patients were significantly lower (p < 0.001) than in non-depressed subjects.

NeuroScience, Inc. obtains neurotransmitter measurements from a fully-licensed, CLIA-certified independent contract laboratory, with one of the most robust quality control/quality assurance programs in the industry. The baseline test panel offers data on 10 key neurotransmitters, showing whether a patient is above, below or within normal ranges.

The neurotransmitters and precursors measured include epinephrine, norepinephrine, dopamine, serotonin, phenylethylamine (PEA), gamma-aminobutyric acid (GABA), glutamate, histamine, glycine and taurine. The primary objective is to bring all of the neurotransmitters into balance by correcting deficiencies through supplementation, carefully guided by a specially trained health care practitioner.

Management of conditions generally consists of three phases. The first, lasting one to two weeks, is designed to bring balance to inhibitory neurotransmitters (GABA, glycine and serotonin). The second phase, generally lasting three to six months, focuses on restoring balance between the inhibitory and excitatory neurotransmitters (glutamate, aspartate, epinephrine, norepinephrine and PEA).

Once a healthy neurotransmitter balance is achieved, the patient enters a maintenance phase in which doses are reduced. At this point, the patient generally notices improvement in mood, energy and/or cognitive function.

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The root causes of neurotransmitter imbalances (e.g., stress, infection, toxicity, diet and allergy) must be addressed in order to maintain the newfound biochemical balance. Lifestyle, diet, and further diagnostic testing are commonly required for more difficult cases or in those cases where symptom improvements are transient.

As with any lab test, results must be interpreted alongside patient history and symptoms. Many patient complaints can emerge from several different neurotransmitter imbalances, so it is important to look at all factors before diagnosis and intervention. While work continues to progress in this emerging field, neurotransmitter testing through urine analysis is proving to be a powerful tool to assess nervous system function and allow health care providers to monitor and treat many widespread clinical conditions.

Dr. Bradley Bush received a N.D. degree from National College of Naturopathic Medicine in 2000 and is currently the Director of Clinician Affairs for NeuroScience, Inc. Dr. Bush specializes in neuro-endo-immune health, nutrition and infusion therapies. His focus is on addressing gastrointestinal and HPA axis disturbances in addition to nutritional deficiencies as a cornerstone of patient care. He is a co-author of the ND: Notes Science Board Review and founder and past-organizer of the annual Pharmaceutical Perspectives conference, and currently sits on the board of the Naturopathic Education and Research Consortium (NERC).