HEALTHY-LONGER

Personalized neuro-nutrient therapy

References

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Background - urinary neurotransmitter measurement methodology

1. ACCURACY

Westermann, Hubl, Kaiser & Salewski (2002) established the accuracy and reproducibility of an enzyme linked immunoassay (ELISA) methodology as compared to previously validated high pressure liquid chromatography (HPLC) methodology. The authors concluded that ELISA measures for urinary epinephrine and norepinephrine are appropriate for clinical applications where rapid, accurate, and reproducible measures were desired.

- Design: ELISA methodology validated against established HPLC methodology.
- Biomarker analysis: urinary & plasma epinephrine and norepinephrine.
- Conclusion: ELISA-based laboratory methodology was validated as a reproducible and accurate means to assess urinary epinephrine and norepinephrine.
- Clinical Correlation: ELISA-based measures for urinary epinephrine and norepinephrine are accurate, cost effective, and efficient measures in clinical settings.

2. URINARY NEUROTRANSMITTER LEVELS REFLECT CIRCULATING LEVELS

Eisenhofer, McCarty, Pacak, Russ, & Schomig (1996) explored the effects of Disprocynium24 (D24), a renal monoamine transporter inhibitor, on catecholamine clearance in a rat model. Upon administration of D24, plasma catecholamines increased significantly, while a significant decrease in urinary catecholamine levels was observed.
The data suggest that urinary catecholamine measures are reflective of circulating catecholamine levels.

- Design: Renal catecholamine clearance in rat was investigated through administration of a monoamine transporter inhibitor
- Biomarker analysis: urinary & plasma epinephrine and norepinephrine.
- Conclusion: Administration of a renal monoamine transporter inhibitor led to significant increases in plasma catecholamine levels and significant decreases in urinary catecholamine levels.
- Clinical Correlation: Urinary catecholamine measures are reflective of circulating catecholamine levels.

3. URINARY NEUROTRANSMITTERS AS BIOMARKERS FOR MENTAL HEALTH

3.1 Vgontzas, Tsigos, Bixler, Stratakis, Zachman Kales, et al (1998) assessed the activity of the adrenal stress system and its association with chronic insomnia. Fifteen adults were tested over 3 consecutive nights for 24 hour levels of cortisol and catecholamines (epinephrine, norepinephrine and dopamine). Findings indicated a positive correlation between total wake time and urinary free cortisol and catecholamine levels. The authors concluded that, based on biomarker analysis, chronic insomnia was correlated with increased activity of the ypothalamic-pituitary-adrenal (HPA) axis and sympathetic nervous system.

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Background - urinary neurotransmitters as biomarkers for mental health

- Design: 15 Chronic insomniacs studied for 3 consecutive nights
- Biomarker analysis: urinary cortisol & catecholamines
- Conclusion #1: In chronic insomnia, an up-regulated HPA axis and sympathetic nervous system was correlated to the degree of sleep disturbance, as indicated by urinary cortisol and catecholamine excretion

3.2 Hughes, Watkins, Blumenthal, Kuhn, & Sherwood (2004) studied the involvement of the autonomic nervous system in depression and anxiety. Urinary catecholamine excretion was measured in 91 women who were also evaluated for depression and anxiety. Higher degrees of depression and anxiety symptoms were associated with increased norepinephrine excretion. These results suggest that depression and anxiety may be associated with increased sympathetic nervous system activity and may be a contributing factor to increased morbidity associated with depressive disorders.

- Design: 91 depressed & anxious women
- Biomarker analysis: urinary cortisol, norepinephrine, & epinephrine
- Conclusion #1: Depression and anxiety, issues related to central nervous system dysfunction, correlated with increased sympathetic nervous system activity as indicated by urinary cortisol & norepinephrine excretion.
- Clinical correlation: Urinary neurotransmitter and adrenal hormone assessments may be useful to effectively address depression and anxiety due to autonomic nervous system dysfunction.

3.3 Kusaga, Yamashita, Koeda, Hiratani, Kaneko, Yamada, et al (2002) explored baseline and treatment levels of urinary phenylethylamine (PEA) in 37 children diagnosed with attention deficit hyperactivity disorder (ADHD) who were treated with methylphenidate. Urinary PEA levels were found to be significantly lower in the ADHD individuals compared to controls. In the treatment group, urinary PEA levels significantly increased in those children who responded symptomatically to the medication, whereas PEA levels did not increase in non-responders. Design: 37 children diagnosed with ADHD, administered methylphenidate

- Biomarker analysis: urinary PEA
- Conclusion #1: Urinary PEA levels were significantly greater in children who responded to methylphenidate.
- PEA levels did not significantly change in those who did not respond to treatment.
- Conclusion #2: Urinary measures of the neurotransmitter PEA correlated with the positive response to a centrally-acting medication.
- Conclusion #3: Urinary PEA correlated with ADHD, an issue associated with central nervous system imbalance.
- Clinical correlation: Urinary measurements of PEA may provide valuable insight into intervention effectiveness in patients with ADHD.

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