

# Targeted Amino Acid Therapy

## An Experimental Evaluation of Targeted Amino Acid Therapy with At-Risk Children

Karyn Purvis, Ph.D., Gottfried Kelleermann, Ph.D., David Cross, Ph.D., Meike Kelleermann, Ph.D., Han Huisman Ph.D., & Jacquelyn Pennings, M.S.

**Abstract**

In this preliminary investigation we explored the efficacy of Targeted Amino Acid Therapy (TAAT) with at-risk children at risk for various behavior disorders. We recruited a sample of 78 children from four support groups, and randomly assigned them to either a treatment group (TG), or to a delayed treatment control group (CG). The treatment consisted of amino acid supplements designed to provide nutritional support for serotonin and GABA production. Data were collected once in mid-July and once in mid-September. Children provided a morning urine sample, and parents completed Kohnsach's Child Behavior Checklist (CBCL) at both time points. Urine samples were assayed for eight neurotransmitters: 5HT, serotonin, norepinephrine, dopamine, norepinephrine, GABA, glutamate, PEA, and histamine. Data were analyzed using repeated measures ANOVA and MANCOV. The treatment group showed significant improvements on four of eight NT assays – norepinephrine, serotonin, GABA, and PEA – and on six of eleven CBCL subscales – Anxious/Depressed, Thought Problems, Attention Problems, Aggressive Behavior, Other Problems, and Internalizing Behaviors. These improvements, resulting from a brief two-month intervention, suggest that TAAT has promise as an intervention for behaviorally distressed children.

**Introduction**

Many families who bring children with special social-emotional needs to a developmental or attachment emotional investigation have great difficulty finding effective professional intervention. Behavioral approaches can be effective, but are relatively scarce. Families often inevitably gravitate towards pharmacological interventions, because there may be no other alternative available to them. However, drug use brings obvious effects with this population of children, and in some instances are contraindicated. In this research report we are investigating the efficacy of a third alternative to behavioral and pharmacological approaches, which is nutritional supplementation using Targeted Amino Acid Therapy (TAAT). Based upon an evaluation of the child's current neurotransmitter levels, TAAT can be used to provide nutritional support for the production of neurotransmitters NT that are deficient in the child's CNS. We hypothesized that by enhancing the production of deficient NT, TAAT can lead to changes both in children's NT levels and in their behavior.

**Participants and Procedures**

78 children, between 4 and 8 years of age, were recruited through local support groups for children with autism. Approximately half of the children (40) had received one or more clinical diagnoses. Families were randomly assigned to either a treatment group (TG) or to a delayed treatment control group (CG). Seventy-eight children had complete data, with non-compliance rates being approximately equal across the two treatment groups. There were 44 children (14 girls, 30 boys, average age = 5.12 yrs) in the TG, and 34 children (14 girls, 20 boys, average age = 5.17 yrs) in the CG. Parents attended an informational meeting, where they were informed about study procedures and TAAT. Pre-testing was done in mid-July, and post-testing was done in mid-September. At both testing times children provided a urine sample, and parents completed Kohnsach's Child Behavior Checklist (CBCL). Based on the pre-test NT profiles, it was decided to focus TAAT on two NT: GABA and serotonin. As a group, the children had depressed levels of norepinephrine, 5HT, serotonin, GABA, and low levels of histamine NT (glutamate, PEA). Children received TAAT support for approximately 8-10 weeks before post-testing.

**Measures**

Families were supplied with one urine sample kit for each child participating in the study. Parents were instructed to obtain the second urine sample at the morning, and then drop the kit in the laboratory in the mailed packaging. Each sample was assayed for norepinephrine, norepinephrine, dopamine, serotonin, GABA, glutamate, PEA, and histamine, with quantities being expressed in parts per gram of creatinine. In general, the children in this sample tended to have very low levels of norepinephrine, either high or low levels of dopamine, and high levels of the remaining NT.

The CBCL is a widely used problem checklist for children and adolescents. It consists of 113 items (e.g., "Frequently angry", "Very or often", "Very frequent"), which parents rate on a 5-point scale (0 = "Not true (as far as you know)", 1 = "Sometimes or sometimes true", 2 = "Very often or often true"). The CBCL yields nine subscales and two composite scales:

- Internalizing: Withdrawn, Somatic Complaints, Anxious/Depressed
- Externalizing: Aggressive Behavior, Delinquent Behavior
- Social Problems, Thought Problems, Attention Problems, Other Problems

**Results**

Data were analyzed with MANCOV to determine if there was an overall effect of the treatment on the children's NT profiles and CBCL profiles. The group x measure x time interaction was significant ( $p < .05$ ) for both the NT and CBCL profiles, indicating different patterns of change for the two groups across measures. Univariate ANCOVAs revealed significant ( $p < .05$ ) group x time interactions for four of the NT (serotonin, norepinephrine, dopamine, and PEA) and for six of the CBCL subscales (Anxious/Depressed, Thought Problems, Attention Problems, Aggressive Behavior, Other Problems, and Internalizing Behaviors). The children showed percent change in each measure with significant group differences in the amount of change, and are highlighted if the percent change was 10% or greater. The highlighting is green if the change is a positive outcome, and red if a negative outcome. All of the ANCOVAs were conducted with gender as a factor, and age as a covariate, in order to control for possible gender and age effects.

**Results and Discussion**

In addition to the analyses of group differences across groups, regression analyses were also done to determine which NT predicted the children's behavior problems as reported by their parents. These NT – norepinephrine, dopamine, and PEA – were in general the best predictors of behavior problems, with PEA being the strongest predictor of the behaviors that changed most significantly: Anxious/Depressed, Thought Problems, and Attention Problems.

Taken together, these results imply that TAAT impacted serotonin and GABA levels directly, and indirectly impacted norepinephrine and PEA levels. In turn, reductions in PEA levels may have played a pivotal role in the reduction of some problem behaviors. Although more research is needed, especially studies that control for placebo effects, this initial study suggests that TAAT is a promising avenue of research and development.

Changes in NT Levels

Morning Urine Levels of	Percent Change	
	Pre-treatment	Post-treatment
5HT	12.1	10.0
PEA	10.0	10.0
Glutamate	10.0	10.0

Changes in Behavior Problems

Child Behavior Checklist Subscale	Percent Change	
	Pre-treatment	Post-treatment
Attention Problems	10.0	10.0
Thought Problems	10.0	10.0
Other Problems	10.0	10.0

Changes in Behavior Problems

Child Behavior Checklist Subscale	Percent Change	
	Pre-treatment	Post-treatment
Anxious/Depressed	10.0	10.0
Thought Problems	10.0	10.0
Attention Problems	10.0	10.0

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**Targeted amino acid therapy** is an innovative approach in nutritional medicine that utilizes specific amino acids to support and enhance physiological functions in the body. This therapy is based on the premise that certain amino acids play crucial roles in biochemical pathways and can be used to address a variety of health concerns, from mental health disorders to metabolic conditions. By tailoring amino acid supplementation to individual needs, healthcare practitioners aim to optimize health outcomes and improve overall well-being.

## Understanding Amino Acids

Amino acids are organic compounds that serve as the building blocks of proteins. They are essential for various bodily functions, including muscle repair, hormone production, and neurotransmitter synthesis. There are 20 standard amino acids, which can be categorized into three main groups:

### 1. Essential Amino Acids

These amino acids cannot be synthesized by the body and must be obtained through diet. There are nine essential amino acids:

- Histidine
- Isoleucine
- Leucine
- Lysine
- Methionine

- Phenylalanine
- Threonine
- Tryptophan
- Valine

## **2. Non-Essential Amino Acids**

These amino acids can be produced by the body, even if they are not consumed in the diet. Examples include:

- Alanine
- Asparagine
- Aspartic acid
- Glutamic acid
- Serine

## **3. Conditional Amino Acids**

These are typically non-essential but may become essential during times of stress or illness. Examples include:

- Arginine
- Cysteine
- Glutamine
- Tyrosine

# **The Role of Amino Acids in Health**

Amino acids are pivotal in various physiological processes. They contribute to:

- Protein Synthesis: Building and repairing tissues.
- Neurotransmitter Production: Affecting mood and cognitive function.
- Hormone Regulation: Influencing metabolism and growth.
- Immune Function: Supporting immune responses.
- Energy Production: Serving as a source of energy during prolonged fasting or intense exercise.

Given their diverse roles, imbalances or deficiencies in specific amino acids can lead to various health issues, prompting the need for targeted amino acid therapy.

## **What is Targeted Amino Acid Therapy?**

Targeted amino acid therapy involves the strategic use of specific amino acids to address particular health conditions or enhance bodily functions. This therapeutic approach is often guided by the individual's unique health profile, lifestyle, and specific health challenges.

# Mechanisms of Action

The effectiveness of targeted amino acid therapy lies in its ability to modulate biochemical pathways. For example, certain amino acids can:

- Enhance neurotransmitter production: Tryptophan is a precursor to serotonin, which plays a crucial role in mood regulation.
- Support muscle recovery: Branched-chain amino acids (BCAAs) such as leucine, isoleucine, and valine can reduce muscle soreness and enhance recovery post-exercise.
- Improve metabolic health: Glutamine can aid in gut health and support metabolic processes during stress.

# Applications of Targeted Amino Acid Therapy

Targeted amino acid therapy has been researched and applied in various health contexts, including:

## 1. Mental Health

Amino acids are integral to neurotransmitter synthesis. For instance:

- Tryptophan: Increases serotonin levels, potentially alleviating symptoms of depression and anxiety.
- Tyrosine: Can enhance dopamine production, improving focus and cognitive function, especially under stress.

Research suggests that supplementation with these amino acids may benefit individuals suffering from mood disorders, attention deficit hyperactivity disorder (ADHD), and stress-related conditions.

## 2. Athletic Performance and Recovery

Athletes often use targeted amino acid therapy to improve performance and recovery. Key amino acids include:

- BCAAs: Help reduce muscle soreness and fatigue during exercise.
- Glutamine: Supports recovery and immune function post-exercise.

Supplementation can lead to enhanced endurance, reduced recovery time, and improved overall athletic performance.

## 3. Metabolic Health

Certain amino acids can influence metabolic processes and support weight management:

- L-Carnitine: Plays a role in fat metabolism, helping to convert fat into energy.

- Arginine: May improve insulin sensitivity and support blood sugar regulation.

Targeted amino acid therapy can be particularly beneficial for individuals with metabolic disorders, such as obesity or type 2 diabetes.

## **4. Gut Health**

Amino acids significantly contribute to gut health:

- Glutamine: Serves as a fuel source for intestinal cells, promoting gut integrity and function.
- Arginine: Enhances blood flow to the gut, supporting overall digestive health.

Targeted amino acid therapy may help manage conditions like irritable bowel syndrome (IBS) and inflammatory bowel disease (IBD).

## **Implementing Targeted Amino Acid Therapy**

The implementation of targeted amino acid therapy should be approached carefully and often involves several steps:

### **1. Assessment**

A thorough assessment by a healthcare professional is essential. This may include:

- Medical history
- Dietary habits
- Lifestyle factors
- Specific health concerns

### **2. Testing**

In some cases, testing may be recommended to evaluate amino acid levels in the body. This can help identify deficiencies or imbalances that need to be addressed.

### **3. Personalization**

Based on the assessment and testing, a personalized plan can be developed. This may involve:

- Specific amino acid supplements
- Dietary adjustments to include amino acid-rich foods (e.g., meat, dairy, legumes, nuts)
- Lifestyle changes to enhance overall health

## 4. Monitoring

Regular follow-ups are crucial to monitor progress and make necessary adjustments to the therapy. This ensures that the individual is responding positively and that any side effects or concerns are addressed promptly.

## Potential Risks and Considerations

While targeted amino acid therapy can offer significant benefits, it is not without risks. Potential considerations include:

- Over-supplementation: Taking excessive amounts of certain amino acids can lead to imbalances and adverse effects.
- Interactions: Amino acids can interact with medications, affecting their efficacy.
- Individual Variability: Each person's response to amino acid therapy may vary, necessitating a personalized approach.

It is crucial to consult with a qualified healthcare provider before starting any supplementation to ensure safety and efficacy.

## Conclusion

Targeted amino acid therapy represents a promising avenue in nutritional medicine, harnessing the power of amino acids to support health and well-being. By understanding the specific roles of individual amino acids and tailoring therapy to meet individual needs, healthcare practitioners can help address a wide range of health concerns. As research continues to evolve in this field, the potential applications of targeted amino acid therapy may expand, offering new hope for individuals seeking to optimize their health through personalized nutrition.

## Frequently Asked Questions

### What is targeted amino acid therapy?

Targeted amino acid therapy is a treatment approach that uses specific amino acids to address metabolic imbalances and support overall health, particularly in individuals with conditions like metabolic disorders, brain health issues, and chronic fatigue.

### How does targeted amino acid therapy work?

The therapy works by providing the body with specific amino acids that may be deficient or imbalanced, promoting optimal metabolic function, neurotransmitter production, and overall cellular health.

## What conditions can be treated with targeted amino acid therapy?

Targeted amino acid therapy can be beneficial for a variety of conditions, including depression, anxiety, attention deficit hyperactivity disorder (ADHD), chronic fatigue syndrome, and certain metabolic disorders.

## Are there any risks associated with targeted amino acid therapy?

While targeted amino acid therapy is generally considered safe, it can carry risks such as potential interactions with medications, imbalances in amino acid levels, and side effects if not monitored or administered correctly.

## How is targeted amino acid therapy administered?

Targeted amino acid therapy can be administered through oral supplements, intravenous infusions, or dietary adjustments, depending on the specific needs of the individual and the guidance of a healthcare professional.

## What evidence supports the effectiveness of targeted amino acid therapy?

Research on targeted amino acid therapy is still evolving, but some studies suggest that specific amino acids can positively influence mood, cognitive function, and metabolic processes, highlighting its potential as a complementary treatment.

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