

Amino Acids

Rationale: Protein is made of long strands of individual amino acids. When protein is digested properly, digestive enzymes split the long protein molecule into small peptides and individual amino acids, which the body can absorb. Those amino acids can then be reassembled to make a wide array of critical substances, such as neurotransmitters, hormones, enzymes, antibodies, immunoglobulins, glutathione, and many other substances. Amino acids are the “building blocks” of life. Some children with autism have self-limited diets that are low in protein, and some have digestive problems that limit their ability to digest protein into individual amino acids. Either of these problems can lead to insufficient amino acids.

Treatments:

- 1) Ensure diet contains sufficient protein (two 4-oz servings/day).
- 2) Consider digestive enzymes to more completely digest the protein into individual amino acids
- 3) Give “free-form” amino acids; “free-form” means that the amino acids exist as individual molecules, rather than part of a large protein molecule that needs to be digested. General amino acid supplements are available, and they can also be customized by a compounding pharmacy.

Testing:

Amino acids can be tested either from blood (when fasting for 10 hours) or from a urine sample (24 hour is best). Fasting blood plasma reveals circulating levels of amino acids related more to metabolism than to diet/digestion. 24-hour urine amino acid analysis shows what's in excess or not usable and what's deficient, if kidney transport is normal. Urine has to be interpreted carefully, as high levels in the urine can indicate “wasting” or excessive excretion, resulting in a low body level.

It may also be useful to measure levels of neurotransmitters in platelets (blood), as low levels of neurotransmitters can be treated by supplementing with amino acids, allowing the body to build their own.

Research:

One study by Aldred et al. found that patients with autism or Asperger syndrome and their siblings and parents all had raised glutamic acid, phenylalanine, asparagine, tyrosine, alanine, and lysine ($p < .05$) than

age-matched controls, with reduced plasma glutamine. Other amino acids were at normal levels. This suggests a general disorder of amino acid metabolism in their families.

Aldred S, Moore KM, Fitzgerald M, Waring RH. Plasma amino acid levels in children with autism and their families. *J Autism Dev Disord*. 2003 Feb;33(1):93-7.