

Understanding and Treating Autism with Nutritional Supplements

Medication options for autistic children are extremely limited, often not effective, and may be associated with unwanted or toxic side effects. As a result, many primary care providers who see large patient populations of autistic children have begun to recommend a variety of nutritional supplements based on observations of nutritional or functional deficiencies in their patients.

A nutritionally balanced diet is often difficult to achieve in autistic children because of sensory issues and obsessive-compulsive behaviors that manifest as rigid and self-limited diets. In addition, many autistic children are reported to have abnormal gastrointestinal symptoms including chronic diarrhea, bloating, or abnormal gut flora. These abnormalities raise the possibility of compromised nutrient absorption. Physicians and parents treating autistic children with vitamin and mineral supplements have anecdotally reported evidence of significant improvements in speech and behavior in some (but not all) of these children.

While there is no scientifically established evidence to support these anecdotal reports, there is also no equivalent evidence to the contrary. Dr. Jill James, Director of the Autism Metabolic Genomics Laboratory, is conducting a study to establish whether or not nutritional supplementation is an effective intervention in these children. The vitamin and mineral supplements selected for the study are based on the regimen currently recommended by many physicians and parents.

To qualify for the study, prospective study patients and their families attend a screening visit in which the researchers determine if a nutritional deficiency exists that could benefit from the targeted nutritional intervention. Patients who exhibit signs of deficiency can then enroll in the study. For enrolled patients and their families, the first study visit includes a blood draw and instruction on dosing as well as metabolic and behavioral evaluations to establish a baseline for reference.

One study participant is Hanna, diagnosed at 3 with autism. Her mother Jessica describes the preschooler's diet preference as "salty and crunchy food" leaning towards hot dogs and pepperoni slices. Hanna will eat crunchy carrots but won't eat anything she considers "slimy" such as puddings, yogurts, and gelatins.

The nutritional intervention includes a liquid, 2 powders and a subcutaneous injection. The doses of these vitamins and minerals do not exceed the accepted maximum tolerated dose.

The parents are definitely partners in this research and often have had to find creative ways to ensure their children, who may have aversions to the textures and tastes of the supplements, receive the recommended doses. For Hanna to receive some of the powdered supplements, Jessica first mixed them with milk and then water, mixtures Hanna did not like. Through talking to Dr. James' staff and with a little ingenuity, Jessica has found an amount of apple juice that is small enough to dissolve the powder while avoiding a gritty solution. She then pulls the solution



Hanna is in a research study to determine whether or not nutrition supplementation is an effective intervention for significant improvements in speech and behavior in some autistic children.

into an oral syringe and then gives it to Hanna with no protest. Another supplemental powder is sprinkled on Hanna's favorite cereal bar.

The study design is a randomized, placebo controlled, double-blind cross-over study, considered the gold standard of research study design. Therefore, the study participants and the research team will be "blinded" to whether the participant receives the active supplement or the placebo for first for 3 months which is followed by the alternative treatment for the second 3 months. After the first treatment period, the child has metabolic and behavioral evaluations and a one-month washout period before the second treatment period. After the second treatment period, Dr. James and her team repeat the metabolic and behavioral evaluations. The order and identity of the treatments will be revealed at the end of the 2-year study. Using the patient data, the researchers will establish whether or not the nutritional supplementation was successful in improving their metabolic profile, immune function and/or behavior.

This is the second autism study in which Hanna has participated. "We liked Dr. James and agree there needs to be more study of autism," says Jessica. She also has an adult brother with autism who was not diagnosed until he was 7 years old. "I think early intervention is key," Jessica says noting that she can see changes in Hanna, now 5, since her diagnosis and treatment. She sees there is now a wealth of knowledge available because of research that was not available for her brother.

Hanna's family is not alone in its support of autism research. An anonymous, private donation to the ACH Foundation provides funds for Dr. James' study.



Established in 1989, Arkansas Children's Hospital Research Institute provides an on-site research environment for faculty of the University of Arkansas for Medical Sciences working on the Arkansas Children's Hospital campus. Over 120 pediatric researchers with expertise and experience that span the breadth of medical disciplines comprise ACHRI's roster of investigators who work to fulfill its mission to improve children's health, development, and well-being through high quality research. For more information, visit <http://achri.archildrens.org>.