

The Mighty Mitochondria Revisited

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Mitochondrial disorders are a “hot topic” following the groundbreaking decision in the Hannah Poling case. (See *New Developments* Spring 2008.) Hannah regressed developmentally, and eventually was diagnosed with autism after reacting to nine vaccines at 18-months-old. Hannah’s parents filed a claim in Federal “Vaccine Court,” where officials conceded that Hannah had a rare, genetically based underlying mitochondrial disorder predisposing her to responding negatively to the shots, leading to fever and an “immune stimulation that exceeded metabolic reserves.”

Five years ago (*New Developments*: 8:3;7), I wrote about the “mighty mitochondria,” at a time when mitochondrial disorders were not well-known. Last October, however, a Portuguese study reported that these disorders are not “rare,” with over 7% of children with autism testing positive. Some believe that at least 20% of children with regressive autism have mitochondrial dysfunction.

What are Mitochondria? Each cell contains tiny powerhouses called mitochondria, whose job it is to convert food into chemical energy. The mitochondria convert fats and carbohydrates into adenosine triphosphate (ATP), the cell’s main source of energy. Well-functioning mitochondria create readily available and sustained energy resulting in toned and well-formed muscles. Exercising muscles strengthens them.

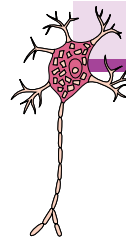
What is a Mitochondrial Disorder? Viruses, environmental and vaccine-containing toxins, including heavy metals, pesticides and even antibiotics, are capable of damaging mitochondria, causing an acquired disorder that compromises cells’ future ability to produce energy. Both genetically inborn and acquired disorders are present in children with autism and other developmental delays.

According to David Kirby, reporting in the online *Huffington Post*, what happened to Hannah and others like her was a “triple domino effect” that goes like this:

1. Child is born with an unknown underlying DNA genetic susceptibility and appears healthy. First trigger: An environmental insult occurs pre-natally, or during the neonatal period or in early infancy.
2. Child develops mild, usually asymptomatic mitochondrial dysfunction. Second trigger: Child’s immune system capacity is over-stimulated and stressed beyond its metabolic reserves from a febrile infection, or from multiple vaccinations, as in the Poling case, resulting in
3. Acute illness, seizures, encephalopathy, developmental regression, autism and loss of muscle tone and stamina.

Individual environmental and genetic influences make some mitochondria more efficient than others. A vast majority of individuals suffer from mitochondrial inefficiency, not disease, and demonstrate symptoms such as restlessness, distractibility and limited attention, resulting from attempts to find comfortable positions which stabilize them.

Mitochondrial Disorders Are Treatable - Whether a child has a known mitochondrial disorder or inefficiency, nutritional treatment is mandatory, because many nutrients are critical for mitochondrial function. Here is a combination that includes the most important components.



The Mitochondria Cocktail

Vitamin B-1 (thiamine) and/or B-2 (riboflavin) are required co-factors for energy making, the last step of which involves converting adenosine diphosphate (ADP) to adenosine triphosphate (ATP). This step takes place in a chain of five protein complexes named Complex I, II, III, IV and V, respectively. Complex I requires vitamin B-1 to stimulate its enzymes. Both Complex I and II require vitamin B-2. This chain of events allows cells to use partially broken down fats and carbohydrates and convert them to energy.

Some children do well with just thiamine; some become irritable with riboflavin, and vice versa. Both B-vitamins plus B-3 (as niacinamide) are necessary for others. Without a specific diagnosis, we must guess which B-vitamins to support. Add them one at a time, observing a child’s response to each supplement.

A typical mitochondria formula contains 50-100 mg each of vitamins B-1, B-2 and/or B-3. Keep in close contact with the supervising medical professional and adjust the B-vitamins if the child becomes agitated.

Vitamin E (mixed tocopherols) protect mitochondria against damage from destructive molecules called free radicals, which are a normal by-product of metabolism. Healthy bodies have the capacity to clean up these volatile substances. However, when too many invade mitochondria, they can damage the membranes and disrupt energy production. Vitamin E is an important anti-free radical agent for protecting and healing cell membranes. Dose at 100-400 IU. Natural vitamin E, usually derived from wheat or soy, is well tolerated and it has no known toxicity. In rare cases though, it can cause allergic problems.

L- Carnitine is a simple protein made up of the amino acids methionine and lysine. Research suggests that carnitine helps maintain the membranes of the mitochondria. In addition, **L-Carnitine** facilitates the transport and utilization of fats so the cells can use it to make energy. For mitochondrial disorders, **L-Carnitine** or the prescription version, Carnitor, is dosed at 50 to 100 mg per kg of body weight. It can sometimes cause irritability or stomach distress, and is not toxic.

Alpha Lipoic Acid (ALA) is a unique anti-oxidant that is both water and fat soluble. Since cell membranes can absorb both water and fat soluble molecules, ALA is particularly useful for stabilizing and protecting cells against free radical damage. Use a coated product such as Xymogen ALA Max, which requires the ability to swallow pills. Discuss the best form of this supplement with your health care practitioner.

Co-enzyme Q-10 (Co-Q-10), also called ubiquinone, helps to regenerate ATP. The body stores only enough ATP to provide energy for about five to eight seconds of strenuous activity, so it must constantly regenerate ATP using Co-Q-10. Dose Co Q-10 at 30-60 mg up to 100 mg. Co Q-10 is non-toxic and well tolerated.

Bottom Line? Healthy mitochondria provide the sustained energy necessary for children’s optimal growth and development. Nutritional support can increase their efficiency even when compromised by a suspected or identified mitochondrial disorder.