



**The Citric Acid Cycle—“*The Power Company*”** is essential for processing and converting all dietary nutrients (vitamins, minerals, fats, amino acids) into useable forms of energy just as the power industry processes coal, gas, or oil for energy production. If you visualize this cycle as a clock, each hour represents an area in which one nutrient converts into a more compatible form of energy. Depending on digestive function, diet, rate of absorption, and the presence of any genetic quirks, a problem might occur at any point within this clock. This may lead to significant metabolic (chemical processing) imbalances within your body chemistry as well as mitochondrial dysfunction or disorders. In fact, mitochondrial imbalances are estimated to occur in at least 50%+ of those with autism and chronic fatigue syndrome. Moreover, when considering a child who only eats a handful of foods and has chronic gastrointestinal issues, the potential for malfunction greatly increases. Similarly, those with leaky gut, Celiac disease and/or inflammatory bowel disorders will have a difficult time meeting their nutritional needs to keep them going.

Yet short of having a blatant mutation, most medical practitioners have overlooked any lesser imbalances. Since many known mutations lead to death and/or serious disability, such as muscular dystrophy, it was generally an all or nothing approach in treating mitochondrial disorders. Despite having abnormal test results and significant health problems, those without recognized mutations were simply sent home. However, in the past two decades, there has been a tremendous shift toward recognizing these less serious defects. This is due to the gradual, yet substantial, number of illnesses and disorders that have surfaced, including certain types of heart disease, CFS/ME, regressive autism, learning disorders, and many other problems with growth and development. Many innovative practitioners now understand the value of assessing for milder genetic typos as well as an individual's fuel source and ability to utilize and process nutrients.

One of the supervisors working with this cycle (ACAT) will occasionally play hooky, particularly when other managers overload him (NOS, MTHFR, BHMT, & CBS). He occasionally has his own difficulties as well, which slows activity to a near standstill and influences many other areas, including:

1. More B-12 depletion, which has ramifications throughout the entire system.
2. Cholesterol & fatty acid imbalances, often leading to toxic fatty acid buildup & high cholesterol.
3. Decreasing bile salts & taurine production as well as poor cell wall function since they all rely on the proper breakdown of cholesterol through the ACAT.
4. Poor breakdown of fats, carbohydrates, & proteins to fuel other cells, nerves, tissue, & organs.
5. Rising oxalate levels that may cause painful urination and bladder & kidney stones.
6. Co Q-10 reduction, which is also necessary for mitochondrial function & energy.
7. Limited energy for the Waste Facility & SAM's Corp. due to less conversion of methionine to SAME. In having over 400 methylation functions, SAME is critical for the entire community.

As the energy factories of each cell, mitochondrial damage has significant implications. In fact, anything that demands more energy, including the gut and the brain, are particularly vulnerable. Since blocks may limit bile salts, digestion is often doubly burdened. This provides valid reasons for why so many with ACAT defects suffer from gastrointestinal problems. It also reveals the mystery behind some cases of poor growth & development and failure to thrive. Defects can also lead to serious disruptions in processing cholesterol, which leads to interference with nerve communication and hormone imbalances. Furthermore, toxins such as aluminum, heavy metals, and glutamates also greatly impact this factory, which is one reason those with known mitochondrial disorders are discouraged from eating foods with pesticides, MSG, and aluminum. Those with multiple risk factors are especially prone to mitochondrial dysfunction. Lastly, anyone with autism, chronic fatigue, ALS, or other degenerative, neuro-immune disorders would do well to heed this chemical factory.