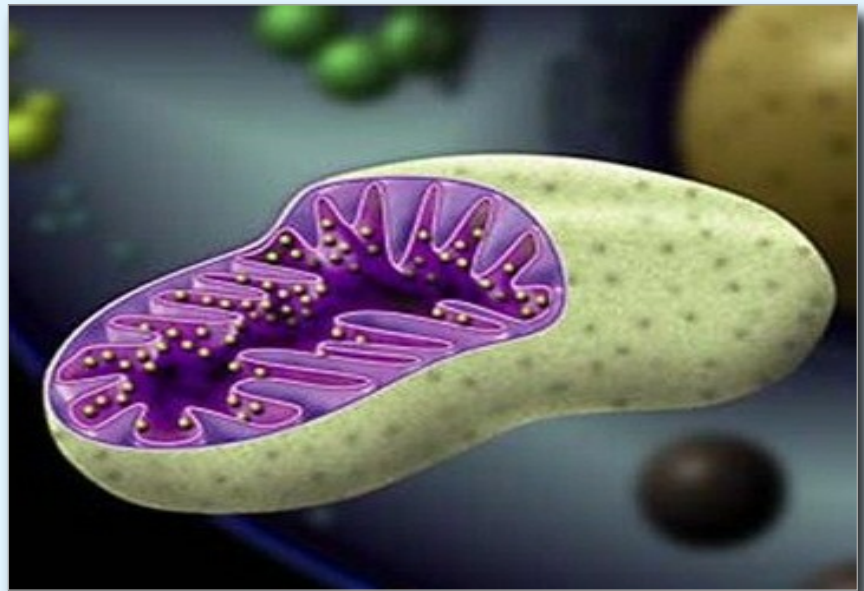


Mitochondrial Dysfunction

"The closer we look, the more we realize that optimizing mitochondrial health will have a profound effect on the rest of the body."

We used to call it the "power plant" of the cell. That's right, I am talking about mitochondria. The closer we look, the more we realize that optimizing mitochondrial health will have a profound effect on the rest of the body. Mitochondrial dysfunction means insufficient ATP production resulting in excess ROS generation which means antioxidant depletion, ultimately inflammation and an increase in cellular aging. A term called "inflamm-aging."



Research is also showing that when mitochondria become dysfunctional they activate the process of inflammation through the NF-kappa B pathway. I call NF-kappa B a genetic amplifier because it can turn up or turn down the inflammatory process through genetic expression. Let me say it this way, "If we know that inflammation pertains to almost every disease and that the etiology of inflammation has to do with mitochondrial dysfunction, then mitochondrial dysfunction plays a role in every disease."

Newer research has uncovered that these bean shaped organelles have other functions that may be just as important as providing chemical energy for the cell. One of those functions is apoptosis or "programmed cell death." The mitochondria are important to decide which cells live and which cells die. Excessive apoptosis causes atrophy and manifest as degenerative disease whereas an insufficient amount of apoptosis results in uncontrolled cell proliferation, such as cancer.

Let's just touch on another big gorilla in the health care world. Metabolic syndrome and the conditions associated with it: diabetes, hypertension and heart disease. It is essential to have healthy mitochondrial function to secrete insulin and for cells to receive insulin. It's easy to see how mitochondrial dysfunction equals disease.

Common "disease states" that are directly or indirectly linked with mitochondrial dysfunction are: inflammation; allergy, especially asthma; autoimmunity, particularly MS and lupus;

metabolic syndrome; type 2 diabetes; hypertension; heart failure; fibromyalgia; migraine headaches; and neurodegenerative disease like Parkinson's and Alzheimer's.

Exogenous causes of mitochondrial dysfunction include: environmental toxins, especially pesticides; nutritional deficiencies; pharmaceutical drugs; high fructose corn syrup; chronic infections; and dysbiosis. In another Tuesday Minute we reviewed five different ways dysbiosis can create neurotoxins and byproducts that can poison mitochondria resulting in a reduced energy state.

Let's consider some basic strategies to correct mitochondrial dysfunction. Remember from Biochemistry 101 how we learned that inside the mitochondria a single glucose molecule goes through the citric acid cycle and then through the electron transport chain and ultimately converts into a net gain of 36 units of ATP? Then first, let's be certain we have all the cofactors necessary to make the enzymes and metabolic byproducts that are needed to optimize ATP production.

We need intracellular energetics to accomplish repair and restructuring. The good news is that we have been supporting mitochondrial function by using basic nutrients like those contained in ProMulti-Plus and Optimal EFAs. We have been adopting Dr. Alex Vasquez five-part nutritional protocol to make sure the major factors have been addressed. You can see a copy below.

As we have discussed before, the citric acid cycle and electron transport chain need B1, B2, B3, B5, magnesium, manganese, lipoic acid, coenzyme Q10, vitamin C and trace amounts of iron and copper to make the enzymes that are necessary for mitochondrial energetics. Deficiencies of key nutrients will result in less ATP.

Extra- and intracellular cell membranes are also dependent upon a healthy essential fatty acid blend like the one found in Optimal EFAs. Optimal EFAs contain EPA, DHA, GLA as well as oleic acid from organic sources tested for purity and free of rancidity. Pertaining to our discussion, DHA is essential for intracellular signaling within the mitochondria. This intracellular signaling is what turns on and off apoptosis.

As we know there are anywhere from 100-2000 mitochondria per cell. Part of the repair process is allowing apoptosis to clean up and destroy the damaged or dysfunctional mitochondria. I started by saying that dysfunctional mitochondria are a major source of free radicals, particularly the reactive oxygen species or ROS. That's one of the reasons Coenzyme Q10 is so valuable to mitochondrial health. In fact, beyond the basic five-part nutritional protocol that Dr. Vasquez mentions, Co-Q is the main nutrient to enhance mitochondrial health. Dr. Vasquez recommends 100-200 mg of Coenzyme Q10.

Both personally and for his patients, Dr. Vasquez uses an emulsified form, CoQ-Zyme 100 Plus, which he formulated with Biotics Research Corporation. You can see a link below on the different forms of CoQ10 and why the emulsified form is so valuable to your compromised patient. Please visit Dr. Alex Vasquez resources below for a more expanded discussion.

Dr. Vasquez actually has 27 strategies for enhancing mitochondrial health and will be the subject of a new book. However, he outlined 12 of them on the presentation below. I rarely get so excited while watching a webinar but I felt this material helps so many pieces of the metabolic puzzle fit together.

Thanks for taking the time to read this week's edition. I'll see you next Tuesday.