

NEWS UPDATES



JULY – AUGUST 2022

The Calcium / Virus Connection

Viruses are known to use calcium and cellular calcium-binding proteins to promote their entry into cells, enhance viral replication and gene expression among other actions. Calcium is a universal cellular messenger. Viruses use this action for their prolific replication throughout the body. The relationship between viruses and calcium falls into three main categories; 1) viral proteins directly impact calcium homeostasis due to altering membrane permeability or affecting the calcium signaling; 2) Viral proteins bind to calcium for structural integrity and function; 3) Impact virus-host activity that depends on calcium regulated protein pathways. *Viral Calciomics: Inteplays between Ca²⁺ and virus. Shou, Y., et al. Cell Calcium, Jul. 46,(1): 1-7 2009.*

Covid-19 and Conflicts with Calcium Therapy

As stated above it is well known that viruses use the mineral calcium in order to infect cells and replicate throughout the body. Viruses mediate an increase in calcium influx into the cells as well. Therefore, some studies have shown that calcium channel blocking drugs such as nifedipine and amlodipine can reduce mortality for coronavirus infection as well as other viruses. These drugs are typically prescribed for the treatment of high blood pressure, by their action of blocking calcium uptake thereby producing a muscular relaxing effect on the heart and blood vessels.

Some studies have found that in many patients' blood calcium is actually low in approximately sixty percent of those with severe COVID-19. However, it is unknown if the reduction in blood calcium exacerbates the coronavirus or if this is a protective mechanism of the host to prevent further cellular viral entry and proliferation. Blood calcium typically returns to normal as COVID-19 symptoms improve. Conflicts over calcium and the treatment of COVID-19. *Cresp, B, and Alcock, J. Evol. Med. Public Health 9 (1) 149-156, 2021.*

Comment

Again, it is well known that viruses use the messenger action of calcium for their survival. We have often discussed our findings at TEI that high tissue calcium levels are associated with either ongoing viral conditions and that this pattern also promotes viral susceptibility along with other mineral imbalances, such as elevated copper, low zinc status or a low zinc to copper ratio. Also, the calcium to phosphorus ratio is elevated as well as calcium levels relative to magnesium. This HTMA mineral pattern is associated with the parasympathetic or slow metabolic mineral pattern. The lowering of calcium can help reduce the viral entry and activity within the cells. Nutritional factors that help reduce excess tissue calcium include phosphorus, zinc, magnesium, and their co-factors such as proteins, vitamin C, niacin, antioxidants, etc. Therefore, based upon HTMA studies we can conclude that the low blood calcium that may develop during active viral conditions is a metabolic adaptation and is an attempt of the body to reduce viral manifestations. Vitamin D levels are typically found low in the parasympathetic HTMA pattern as well. Due to the synergistic relationship between calcium and vitamin D, the low vitamin D may also be an adaption by the host to reduce further tissue calcium accumulation, reducing viral replication and proliferation. Viruses are also known to produce an auto-immune response, particularly cellular autoimmunity. We have classified HTMA mineral patterns of parasympathetic dominance to be related to an increased cellular auto-immune response which itself can be a factor in contributing to the severity of viral infections and blocking the cellular immune response would reduce this severity.

COVID-19 and Autonomic Nervous System Disturbance

Jamal, et al, recently reported their examination of patients with post-acute COVID-19, and their autonomic response. Symptoms reported weeks after recovering from acute COVID-19 include cardiac palpitations, tachycardia, poor stamina, and cognitive dysfunction. Their results found that almost all had orthostatic intolerance on a tilt table test. The tilt table test is usually performed on individuals who often feel faint or lightheaded, especially when rising from a lying or seated position as well as experiencing cardiac abnormalities. During the test, patients lie on a table that is slowly tilted upward. The test measures how the blood pressure and heart rate respond to the force of gravity while tracking blood pressure and heart rate and pulse see how they change during the test. Several of the participants had met the criteria for postural orthostatic tachycardia syndrome (POTS). Symptoms of POTS include, lightheadedness, fainting, poor concentration, brain fog, fatigue, poor exercise tolerance, blurred vision, tremors, palpitation, and nausea. The authors concluded the mechanism related to the post COVID-19 patient's symptoms was dysregulation of the autonomic nervous system. *Prospective evaluation of autonomic dysfunction in post-acute sequela of COVID-19. Jamal SM, et al. J.Am.Coll.Cardiol. June 2022.*

Comment

Autonomic tone which is the normal balance between the sympathetic and parasympathetic autonomic nervous system (ANS) can be become dysregulated in individuals with POTS due to COVID=19 or other viruses, other health conditions and medications. When the balance is disturbed due to miscommunication between the branches of the ANS one can become dominate over the other. The slow metabolic HTMA pattern is associated with dominant parasympathetic activity due to an autoimmune reaction or withdrawal of the sympathetic branch. The opposite can also occur contributing to many of the symptoms described above.

HTMA - A Biomarker of Selenium Status and Supplementation

The elderly urban population in China are known to have a widespread deficiency of daily selenium intake. HTMA was studied for the possibility of it being used as low-cost, non-invasive, and reliable method to monitor the health improvement or risk for elderly Se-supplemented population in China. The study included 229 participants older than 55 years of age living in Beijing, China. Selenium concentrations were tested in urine serum and hair. Selenium concentrations in the serum and urine did not show statistical significance between those who supplemented with selenium and those who did not supplement. However, hair selenium levels did reflect supplementation compared to those who did not. Results revealed increased hair levels of selenium in supplement users with an increase in serum selenium after seven months of supplementation. The researchers concluded "An ongoing monitoring of Se status via hair is still warranted to prevent future deficiency or excess in China." *Se Supplementation in Elderly. Biological Trace Element Res. Ma, ZF, et al. Hair Se Is a Sensitive Biomarker to Monitor the Effects of Vol. 2022.*
