

Exciting New Gut Formula

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One of the unsung heroes of the gut is the four-carbon fatty acid, Butyrate. Butyrate is produced by the microbial fermentation of dietary fiber and is the primary energy source for epithelial cells of the colon called colonocytes. And we know if a cell doesn't have sufficient energy, it can't maintain its integrity and function as intended. As a result, intestinal barrier integrity is compromised, which leads to all kinds of problems. Surprisingly, the research shows there are many applications beyond the gut for this little energy package. The literature shows butyrate plays a role in immune modulation, cancer suppression, cell differentiation, intestinal barrier regulation, oxidative stress reduction, diarrhea control, and visceral sensitivity. Butyrate also plays a role in gene regulation as it is a histone deacetylase (HDAC) inhibitor.

Here's another application I didn't consider. Dr. Mark Force shared his first choice to support GABA utilization is butyrate because it not only supports healing the tight



junctions of the gut wall barrier, but it also supports healing the blood brain barrier. And Cardiologist, Jack Wolfson, shared an article on butyrate and how it stabilizes plaque. You can see earlier Tuesday Minutes that highlight butyrate benefits to the right.

Biotics Research was one of the first companies to provide butyrate as sodium butyrate in Butyric-Cal-Mag. Although effective, it had some drawbacks. One was the smell. In the beginning, patients had to be cautioned when they opened the bottle because the odor was... well... it was intense to put it mildly. That challenge was overcome with a little vanilla flavoring. But the

production of intestinal gas was still a problem. Also, because it is a four-carbon molecule, it was never clear if oral butyrate reached colonocytes because some of it was used as fuel by the enterocytes in the proximal or beginning of the small intestine. To assure that it reached the colon, a heavier dose was used by clinicians, usually 2-3 tid depending on the size of the patient.

Although the name Butyric Cal-Mag remains the same, Biotics has updated the formula by using ButyraGen™, a Tributyrin Complex as the source of butyrate. 2 capsules of Butyric Cal-Mag supply 975 mcg of vitamin A, 16.7 mg of

pantothenic acid, 40 mg of magnesium, 40 mg of calcium, and 1000 mg of butyrate as Tributyrin. Tributyrin is more bioavailable, and it's better tolerated, as in less gas and odor.

Many of us have been using comprehensive stool digestive analysis and have seen the short chain fatty acid butyrate on the report and value it as an important nutrient to feed the colonocytes. And we've seen the benefits as the bowel heals and often diarrhea and bloody stools disappear. But as I mentioned, butyrate has value in other areas; gene regulation, oxidative stress reduction, and blood brain barrier support. Considering its benefits outside the colon, Tributyrin allows for significantly higher plasma levels over sodium butyrate, with approximately three times the serum half-life. Tributyrin is rapidly absorbed and hydrolyzed to butyrate when metabolized by pancreatic lipases. Tributyrin is another nutrient that activates PGC-1a. PGC-1a is an essential inducer of mitochondrial biogenesis.

You can see an earlier TM that describes how when PGC-1a is reduced, telomere shortening occurs. We know that when telomeres are shortened telomere dysfunction results in DNA damage. However, as PGC-1a is elevated telomeres are repaired, DNA damage is reduced and the mechanisms for senescence, aging, and associated chronic disease are repaired.

Tributyrin has been shown to support liver function in a variety of ways. It prevents fat accumulation and supports liver function when

exposed to alcohol toxicity. It also protects the liver from damage in response to lipopolysaccharide (LPS)-induced liver injury. The support comes from downregulating several inflammatory mediators, including NF-kB, which we know is a critical regulator of inflammation. Tributyrin has been shown to modulate PPAR α and AMPK, with favorable effects on memory and cognitive function in animal models of memory impairment. Activation of AMPK also appears to be one mechanism by which butyrate enhances intestinal barrier function. As AMPK activation increases, so does the assembly and integrity of epithelial tight junctions.

Perhaps the greatest benefit for switching from sodium butyrate to Tributyrin is the dose reduction. Whereas with sodium butyrate, 2-3 capsules tid was suggested, research indicates 1-2 capsules bid would achieve the same effect.

As a reminder, creating the milieu for the body to make butyrate naturally is also important. Consider adding BioDoph-7 Plus as well as *Saccharomyces Boulardi* to enhance the natural production of butyrate. So, if you have a bowel-resistant patient, and your current therapies aren't working, consider feeding the cells that maintain homeostasis in the bowel. And remember that by supporting with butyrate you are creating some additional anti-inflammatory, antioxidative, anti-neoplastic, and antimicrobial benefits beyond the gut.

Thanks for watching. I look forward to being with you again next Tuesday.