MCT - Medium Chain Triglycerides or Fatty Acids
common component of coconut oil and milk; commonly used as filler in supplements

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MCT, Lauricidin, and Monolaurin Basic Properties

Thanks to several parents reporting a decrease in hearing sensitivity with Houston enzymes containing MCT . . . and some other parents reporting with specific details, some new information on MCT has come up. Viruses can be hard to treat. Enzymes can be effective. The following compounds can also be effective. Combined together digestive enzymes and these compounds might work together very synergistically and be effective in a viral treatment program.

see Enzymes and Viruses
see Enzymes and Virus Research

Here are some basics on the nutrition of MCT.

- MCT = medium chain triglycerides (a type of fat or oil)
- also known as medium chain fatty acids comparable to omega 3s

- MCT is know for quick energy [we have seen in the past that anything promoting energy can cause rage, aggression, hyperactivity, etc is too much, or too unexpected]

- MCT is in coconut oil and breast milk and contributes to the healthful benefits and healing properties of those items [http://www.coconut-info.com/mcts.htm with references at that site]

- MCT is used in maladigestion, children with terrible digestive diseases or problems, liver problems, and body-builders because it is quickly absorbed and used [reference 1, 2 and 3 below]

- MCT is added to diets where there are bile problems, pancreatic problems, and poor fat metabolism because MCT does not need the standard enzyme digestion path to be absorbed

- MCT can act on viruses [reference 4-7 and there were lots more] and two parents’ observations agree with what they have seen with antivirals in the past. I wondered if there was enough MCT as trace filler to cause a reaction, but it might not take much with highly sensitive kids. When considering there would be an enhanced effect because of the synergistic presence of enzymes, and you have a reasonable and logical case.
A few references said the MCT would also work to kill down bacteria. Maybe other pathogens too but viruses and bacteria were specifically named.

Here are a few points contained in one of the abstracts below:

1. That since the it is the lipids portion that because active in the gut or other mucosal area, dairy processing procedures probably don't impact it negatively unlike pasteurization killing off the natural enzymes. It happens after consumed and is noted as being good for stressed immune systems.

"Antimicrobial milk lipids may be particularly important in protecting infants with an inadequate secretory immune response from infection. The lipid-dependent antimicrobial activity of milk is due to medium-chain saturated and long-chain unsaturated fatty acids and their respective monoglycerides released by lipases in the gastrointestinal tract."

2. The effect is additive. So you might see a bigger impact is you just switched from regular dosing with non-MCT containing enzymes to full regular dosing with MCT containing enzymes:

"The antimicrobial activity of fatty acids and monoglycerides is additive and consequently it is their combined concentration that determines the lipid-dependent antimicrobial activity of milk."

3. Die-off can occur rapidly.

"Microbial inactivation occurs rapidly by membrane destabilization."

**Lauricidin / monolaurin / Coconut oil**

"Coconut oil has a highly purified mono-glyceride known as Lauricidin. This mono glyceride has found use in cosmetics, pharmaceuticals, and in clinical medicine. Mono lauricidin as a dietary supplement has shown extraordinary and exciting results as an antibiotic and an anti viral agent. The latter property against lipid coated viruses was first demonstrated by Hierholzer and Kabara more than sixteen years ago. Today mono laurin in coconut oil is appearing at an increasing rate showing applications in dental cares, peptic ulcers, benign prostrate enlargements in men, genital herpes, hepatities C and HIV/AIDS."


"Lauricidin® (monolaurin) is one of the most important fats found in mother's milk and partially responsible for the milk's antibacterial, antifungal and antiviral properties."

[www.lauricidin.com](http://www.lauricidin.com)
A number of people with viral problems see improvement with the Lauricidin. The main site is given above. There is a Frequently Asked Questions page there as well as additional information. There is one paragraph that says to avoid using Lauricidin with digestive enzymes. However, upon research exactly what this meant (because there shouldn't be any adverse effect) the response was that since the Lauricidin is a fatty acid, lipase enzymes might reduce its effectiveness if taken at the exact same time. This is speculation as no adverse reports have been given. Other enzymes wouldn't have any effect except to perhaps make the Lauricidin better absorbed and more effective. You can always give enzymes at different times than the Lauricidin too.

Additional information on monolaurin containing products and information

http://www.smartnutrition.info/info-monolaurin.htm

research on coconut oil and various illnesses
http://www.coconutoil.com/

assorted information on coconut oil and monolaurin in it
http://www.coconut-connections.com/index.htm
http://www.coconut-info.com/
www.westonaprice.org/know_your_fats/coconut_oil.html

see Dairy increases absorptive villi in gut

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References
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1. Lipid requirements in infants with digestive diseases with references to short bowel syndrome.


The treatment of infants with short bowel syndrome aims at restoring the intestinal continuity and at improving the physiological process of gut adaptation. Appropriate parenteral and enteral feeding must be directed at maintaining an optimal nutritional status. Due to a varying degree of long-chain triglyceride malabsorption, part of the dietary fat needs to be supplied in the form of medium-chain triglycerides in most patients. The dietary fat composition must also meet the needs for essential fatty acids and take into account the positive effects of long-chain lipids on gut trophicity. Appropriate dietary manipulations are of great benefit for infants and children with chronic digestive diseases.

2. Meeting lipid needs of infants with allergy and gastrointestinal diseases.


Infant formulas containing medium chain triglycerides (MTC) have been used for the nutritional management of infants with fat malabsorption. The optimal proportion of MTC in the formula remains to be determined. Three infant formulas with varying
proportion of MTC in the fat blend were studied in children with cystic fibrosis, cholestasis or persistent diarrhea. The formula containing 48% of the total energy from fat and 55% of the fat component as MTC was found to be the most suitable for the needs of those infants. It leads to an adequate essential fatty acid status and to improved recovery in those conditions.

3. Nutritional considerations and management of the child with liver disease.

Novy MA, Schwarz KB. Department of Pediatrics, Johns Hopkins University School of Medicine, Baltimore, Maryland, USA. Nutrition. 1997 Mar;13(3):177-84. PMID: 9131675

Nutritional management of the infant and child with liver disease is highly dependent upon the type of liver disease. Acute liver disease, such as that secondary to viral hepatitis, requires no specific nutritional therapy with the exception that branched-chain amino acid supplements may be indicated in the management of hepatic encephalopathy. Nutritional management of the child with chronic liver disease depends upon whether or not cholestasis is present, since in that condition, large amounts of fat-soluble vitamin supplements and medium-chain triglycerides are usually required for optimum growth. However, anicteric cirrhotic liver disease also presents nutritional challenges because of hypermetabolism, enteropathy, and increased protein oxidation. Certain inborn errors of metabolism that result in liver disease (including alactosemia, hepatorenal tyrosinemia, hereditary fructose intolerance, and Wilson's disease) have specific nutritional requirements. And, finally, the advent of pediatric liver transplantation has placed new emphasis on the importance of optimum nutritional management of the child with chronic liver disease, since improvement of nutritional status in the pretransplant period maximizes success of the transplant. This review will focus on the pathogenesis of malnutrition in childhood liver disease and will provide recommendations for nutritional assessment and monitoring as well as nutritional management of cholestatic liver disease, anicteric cirrhotic liver disease, and the inborn errors of metabolism enumerated above. Specific recommendations for nutritional management of the child awaiting liver transplantation will be provided.

4. Inactivation of visna virus and other enveloped viruses by free fatty acids and monoglycerides.


Human milk was found to become antiviral during storage at 4 degrees C because of the release of fatty acids by lipolysis. The stored milk caused more than a 10,000-fold inactivation of visna virus during incubation at 37 degrees C for 30 minutes. Medium-chain saturated and long-chain unsaturated fatty acids inactivated visna virus and other enveloped viruses causing more than a 3000-fold to 10,000-fold reduction in virus titer. 1-Monoglycerides and ethers of medium-chain fatty acids were more antiviral than the corresponding free fatty acids. Antiviral fatty acids were found to affect the viral envelope, causing leakage and, at higher concentrations, a
complete disintegration of the envelope and the viral particles. Lipids commonly found in natural products could possibly be used as antiviral agents against enveloped viruses.

5. Inactivation of enveloped viruses and killing of cells by fatty acids and monoglycerides.


Lipids in fresh human milk do not inactivate viruses but become antiviral after storage of the milk for a few days at 4 or 23 degrees C. The appearance of antiviral activity depends on active milk lipases and correlates with the release of free fatty acids in the milk. A number of fatty acids which are normal components of milk lipids were tested against enveloped viruses, i.e., vesicular stomatitis virus, herpes simplex virus, and visna virus, and against a nonenveloped virus, poliovirus. Short-chain and long-chain saturated fatty acids had no or a very small antiviral effect at the highest concentrations tested. Medium-chain saturated and long-chain unsaturated fatty acids, on the other hand, were all highly active against the enveloped viruses, although the fatty acid concentration required for maximum viral inactivation varied by as much as 20-fold.

Monoglycerides of these fatty acids were also highly antiviral, in some instances at a concentration 10 times lower than that of the free fatty acids. None of the fatty acids inactivated poliovirus. Antiviral fatty acids were found to affect the viral envelope, causing leakage and at higher concentrations, a complete disintegration of the envelope and the viral particles. They also caused disintegration of the plasma membranes of tissue culture cells resulting in cell lysis and death. The same phenomenon occurred in cell cultures incubated with stored antiviral human milk. The antimicrobial effect of human milk lipids in vitro is therefore most likely caused by disintegration of cellular and viral membranes by fatty acids. Studies are needed to establish whether human milk lipids have an antimicrobial effect in the stomach and intestines of infants and to determine what role, if any, they play in protecting infants against gastrointestinal infections.

6. The role of milk-derived antimicrobial lipids as antiviral and antibacterial agents.


7. Inactivation of enveloped viruses in human bodily fluids by purified lipids.

Antimicrobial lipids are found in mucosal secretions and are one of a number of nonimmunologic and nonspecific protective factors found at mucosal surfaces. Lipids can inactivate enveloped viruses, bacteria, fungi, and protozoa. Lipid-dependent antimicrobial activity at mucosal surfaces is due to certain monoglycerides and fatty acids that are released from triglycerides by lipolytic activity. Medium chain length antiviral lipids can be added to human blood products that contain HIV-1 and HIV-2 and reduce the cell-free virus concentration by as much as 11 log10 TCID50/ml. The presence of lipids does not interfere with most clinical assays performed on human blood samples. Antimicrobial lipids can disrupt cell membranes and therefore lyse leukocytes which potentially carry virus. Genital mucosal epithelial cells should be protected from damage by the mucous layer. Preliminary studies indicate that lipids decrease sperm motility and viability suggesting that lipids may potentially be used as combination spermicidal and virucidal agents.

What about trace MCT in enzyme or other supplements

This came up when a commonly used enzyme was offered with trace MCT instead of rice bran. For most people, it doesn't make any difference, but for a few, it might. Discussion on why it might make a difference for some follows. The enzymes in the two versions of the same product are identical, so it looks like the different responses were due to the fillers.

At the moment, this is what is shaking out:

- If someone does not tolerate coconut or has a coconut allergy, they may also not tolerate MCT in supplements. MCT is not always listed on the supplement label if it is in a product.

- If someone has a virus problem, the MCT in a supplement may cause a 'die-off' reaction as it interacts and kills off some virus. Lauricin and coconut oil do this as well. MCT has been identified in breast-milk with the same anti-microbial properties.

- If someone tolerates MCT or coconut oil OR does not have a virus issue or yeast/bacteria issue, it looks like they won't have any issues with a supplement formulation with MCT.

- If someone has a viral issue, they might find the MCT containing products more helpful because of the anti-viral 'side-benefit'. OR if someone has a viral issue, they may want to be prepared for more viral die-off when starting. Very much like those dealing with yeast need to be prepared for yeast die-off when starting No-Fenol, Candidase, or Candex...and start slowly.
- If you see a pronounced reaction when switching to an MCT containing supplement, you might want to consider that there is a viral issue going on or a coconut allergy, and start investigating how to handle that.

- If you see a pronounced reaction when switching to the MCT products AND you know you have yeast/bacteria issues, the cellulose might be stirring things up and there are adjustments going on. I don't think the cellulose with cause a significant flare-up with yeast or bacteria simply because the other enzymes in the blend would be pouncing on it and breaking the cellulose down. And the cellulase in an enzyme product would be working to break down any rising yeast growth as well as the cellulose present. So it would be a net wash in the end. But any immediate shift in your diet/supplements can cause 'activity' and changes in the gut flora and fauna. This would probably be more pronounced if going to bulk powder versus capsules. The bulk powder contains slightly more cellulose per serving than capsules do.

- MCT oil may be effective especially in the presence of digestive enzymes. Enzymes act synergistically with anti-microbial treatments. Research and experience confirm this happens with cancer treatments, viral treatments, antibiotics, and antifungals (see research in each of these areas).

- Several parents reported that when they switched to an MCT-containing version of an enzyme product they had been using successfully, their child displayed noticeable improvements in hearing and auditory processing.

As it turns out, there are many many studies showing that all sorts of viruses cause hearing and auditory processing problems. And treating viruses improves hearing and auditory processing.

There is already the strategy of giving essential fatty acids to improve hearing and language (ProEFA, Efelex, EFAs). And fatty acids assist with gut intestinal lining integrity and myelin integrity. It helps coat and protect nerves. And MCT = medium chain triglycerides or medium chain fatty acids. Sooooo, it looks like the dots connect on that front, and it is very logical that a product containing MCT can contribute to improve auditory function.

While rummaging through Pubmed and other places, here are some other points of interest:

1. The anti-viral actions of MCT were fairly quick...like working in seconds.

2. One study specifically tested various fillers. It found that microcrystalline cellulose helped to disperse supplements and medications faster and more evenly than other fillers, caused less side-effects, and the supps and meds were faster absorbed. This is consistent with reports that enzymes with microcrystalling cellulose mixed up nicely and didn't clump. It might also mean the person was seeing slightly better activity with the
cellulose products over a previously used product with a different filler...and this could mean another small wave of die-off or withdrawal effects in the beginning of switching to the cellulose containing product.

3. Couldn't find anything indicating that cellulose as a filler in supplements encourage yeast or bacteria growth. It is used in some antibiotics and antifungals, so it can't be much of a concern if they are putting it in products to treat bacteria and yeast problems. Plus, most enzyme products contain enzymes to break down the cellulose or rice bran anyway.

4. These were a couple studies where they found guar gum to be much more a problem and cause stomach/colon discomfort than microcrystalline cellulose. So if you are eating gums (guar, xanthum, etc), and there are stomach problems, might keep this in mind.

5. Several studies showed that papain or bromelain (and perhaps other proteases) inhibited candida yeast from adhering to the gut or tissue. So this supports another mechanism by which proteases fight yeast. A couple studies are listed at the bottom of this page:

http://www.enzymestuff.com/conditionyeastresearch.htm

The MCT in some supplements or enzyme product might be killing off some viruses (which is good overall), but if the person isn’t expecting it and is not prepared for the adjustment or detox period, they might be a little surprised. The same situation happened with the introduction of No-Fenol and its yeast-killing effect on those with candida infections. Good overall, but it is better if you are prepared so you can go slow and plan on die-off.