

Issue Highlights

- *Fatty Acids—Viral connection*
- *L-Carnitine*
- *Jemsek Clinic—Huntersville, NC*

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THE RATIONALE FOR UTILIZING LAURIC ACID-RICH FOODS AS ADJUNCT THERAPY FOR INDIVIDUALS WHO ARE HIV POSITIVE.

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IS IT TIME FOR A NEW SUPPORT REGIMEN?

In December 2000 several announcements were made about the expected changes to treatment protocols for individuals with HIV infection. These announcements were in opposition to the previous recommendations from the mid-nineties, which had called for early treatment with multiple protease inhibitor drug cocktails. This aggressive approach, even when the HIV-positive (HIV+) individual did not have active symptoms was done with the hope of the ultimate cure.

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Editor's Corner

The *HIV ReSource Review* has a new look, and a new name! The *HIV Nutrition Update* will help us to keep up with trends, research and breaking news. It offers reliable and timely information on all issues related to nutrition and HIV. The *HIV Nutrition Update* provides information in an easily read format. Readers can continue to look forward to timely advice and useful tools without the

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Along with popular columns such as Med Watch, the Resource Corner, and Program Spotlight, every newsletter issue will include a feature article and more columns. The feature article continues our tradition to offer new insights and bring you recent original research and information on interesting

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EDITOR'S CORNER

HIV Nutrition Update is a bimonthly newsletter of practical and timely nutrition resources. Features present peer-reviewed articles and practice-oriented reviews of essential information for the clinician working in HIV/AIDS care. Information is supplemented by news releases, conference proceedings, and expert recommendations.

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It was soon recognized that these multiple drug cocktails did not produce an actual cure, and when the drugs were stopped there was undesirable rebound of viral load. Additionally, the side effects of these multiple drugs were unappealing to many and of questionable safety. At the same time, many individuals found that the regimen was too complicated and difficult to balance with interacting foods and life schedules. Eventually this treatment approach has been recognized as having too many side effects without real evidence of potential for cure.

“Additionally, the side effects of these multiple drugs were unappealing to many and of questionable safety.”

To those familiar with the history of the HIV/AIDS epidemic, this signaled a time for re-evaluating the natural history of HIV infection. Several things are now clear. ⁽¹⁾ HIV infection does not always progress immediately to AIDS. ⁽²⁾ The increase in viral load is one of the major causes of the progression to AIDS. ⁽³⁾ The decrease in CD4 and CD8 T-cells is also another cause of disease progression.

There are a number of factors that determine whether or not the viral load will increase in any given person. The extent to which an individual's immune

system is compromised at any time during the course of the disease varies making it difficult, if not impossible, to predict.

The safety issues are particularly problematic for pregnant women. While AIDS researchers, government agencies, and pharmaceutical companies argue about the safety of drug treatments for HIV+ pregnant women, there is a potential safe adjunct treatment. This method can be

helpful because it appears to lower the level of the virus and raise the CD4 and CD8 T-cell levels without adverse side

effects. It also appears to be effective in lowering viral load without introducing adverse side effects such as the lipodystrophy seen with the multiple protease inhibitor drug cocktail treatment. A comprehensive overview of many aspects of this adjunct treatment can be found on the Center for Research on Lauric Oils, Inc. web site at <<http://www.lauric.org/>>.

Editor's Note: See page seven for more information on this web site, which offers visitors an opportunity to enter a clinical trial.

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WHAT IS THIS ADJUNCT TREATMENT?

This safe adjunct treatment is the lauric acid monoglyceride called monolaurin, which can be formed in the body from the lauric acid found in certain foods. It is the lauric acid portion of coconut products, including the foods made of whole coconut, desiccated coconut (macaroons), coconut cream, coconut milk, and of course coconut oil that provide the potential treatment benefit. Palm kernel oil and babassu oil (Brazilian oil extracted from a type of palm tree that grows in Brazil; it has about 50% lauric acid.), which are also lauric oils, provide the same benefit as coconut oil, although they do not have the same potential for simple use in diets compared to coconut products. Provision of adequate lauric acid from dietary sources to the HIV+ adult, child, or infant enhances the formation of monolaurin. Information about this adjunct treatment should be made available to every HIV+ individual, especially to pregnant women and to caregivers of HIV+ children. Moderate amounts of lauric oils were in the U.S. food supply before the 1980s, until they were largely replaced by partially hydrogenated soybean and canola oils. The detailed history and protocol has been published ⁽¹⁾ and is reviewed on the Internet at <<http://www.lauric.org>>.

WHY IS THIS ADJUNCT TREATMENT IMPORTANT?

A lowering of the viral load in HIV+ individuals has the potential for preventing the progression to AIDS. Lowering the viral load in pregnant women has the potential for preventing vertical transmission of HIV to the infant. Lowering viral load, and perhaps enhancing immune function, gives a hint of reversing HIV status in infants. The reversal of HIV in infants, which has been documented on occasion, needs to be investigated for its potential since the use of high levels of lauric acid has an established precedent in both human milk and infant formulas.

While drug companies are working on vaccines to kill off HIV, monolaurin can potentially destroy the lipid envelope that interferes with the potential vaccine. Some of the vaccine effort aimed at destroying the protein core could be greatly enhanced by the large-scale destruction of the lipid envelope of the virus.



A lowering of the viral load in HIV+ individuals has the potential for preventing the progression to AIDS.

HOW DO WE KNOW THAT LAURIC OILS HAVE THE POTENTIAL FOR DESTROYING HIV AND OTHER PATHOGENIC VIRUSES?

Recognition of the antimicrobial activity of monolaurin has been reported since 1966. The seminal work can be credited to Jon Kabara at Michigan State University. Many of the pathogenic organisms reported to be inactivated by these antimicrobial lipids are those known to be responsible for opportunistic infections in HIV+ individuals such as cytomegalovirus (see <<http://www.lauric.org/lcv.html>>).

Numerous researchers ⁽²⁻⁶⁾ have reported that certain fatty acids (e.g., medium-chain saturates) and their derivatives such as monoglycerides can have adverse effects on various microorganisms. Microorganisms that are inactivated include bacteria, yeast, fungi, and enveloped viruses. These fatty acids and their derivatives act by disrupting the lipid membranes of the organisms. In particular, enveloped viruses are inactivated in both human and bovine milk by

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added fatty acids (FAs) and monoglycerides (MGs) as well as by endogenous FAs and MGs. (7-12)

The properties that determine the anti-infective action of these lipids are related to their structure e.g., monoglycerides, and free fatty acids. Monoglycerides are active while diglycerides and triglycerides are inactive. Of the saturated fatty acids, lauric acid has greater antiviral activity than either caprylic acid (C-8), capric acid (C-10) or myristic acid (C-14) for these viruses.

Isaacs and Thormar reported that the antimicrobial effects of the FAs and MGs are additive and total concentration is critical for inactivating viruses. (13) Some of the viruses inactivated by these lipids, in addition to HIV, are the measles virus, herpes simplex virus-1 (HSV-1), vesicular stomatitis virus (VSV), visna virus, and cytomegalovirus (CMV). As noted earlier, many of the pathogenic organisms reported to be inactivated by these lipids are those known to be responsible for opportunistic infections in HIV+ individuals. According to the research,

lauric acid is one of the best "inactivating" fatty acids, and its monoglyceride is even more effective than the fatty acid alone.



Monoglycerides are active while diglycerides and triglycerides are inactive.

The antiviral action attributed to monolaurin is that of solubilizing the lipids and phospholipids in the envelope of the virus causing its disintegration. In effect, it is reported that the fatty acids and monoglycerides produce their killing / inactivating effect by lysing the (lipid bilayer) plasma membrane. There is evidence from some recent studies however, that one antimicrobial effect of monolaurin is related to its interference with signal transduction in cell replication.

TAKING ADVANTAGE OF THIS ADJUNCT SUPPORT

An individual who is HIV+ can take advantage of this adjunct support by simply adding coconut products to the diet and by reducing other processed fats and oils in the diet. This means that all of the partially hydrogenated vegetable fats and oils should be eliminated from the diet.

Partially hydrogenated vegetable oils are found in margarine (stick margarines have the highest amount), baked goods such as cookies and crackers, prepared frozen meals, many if not most package foods, and snack foods in addition to many other processed foods. They are usually made from soybean oil, cottonseed oil and canola oil. People who are HIV+ need to carefully read labels of purchased foods, and to ask the appropriate questions about the composition of the fats and oils used in food preparation when someone else is preparing foods. This is easy enough to accomplish if HIV+ people do their own food preparation, but it may take some extra effort if most meals are eaten in restaurants or prepared by others.

WHAT LEVELS OF LAURIC ACID ARE REQUIRED FOR ANTIMICROBIAL EFFECT?

Based on the amount of lauric acid found in human milk, which is known to be effective in its role as an antimicrobial component for the infant, the percent of calories that would be appropriate can be determined. For example, human milk provides at least 3.5 percent of calories as lauric acid for the human infant. Mature human milk has been

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noted to have up to 12 percent of the total fat as lauric acid (approximately 6.6 percent of calories).⁽¹⁴⁾ The upper end of this range represents approximately twice the amount of calories as lauric acid (i.e., 7 percent of calories) as does the minimum.

When developing lauric-rich diets for adults, one can use this range as the starting point for calculating the amount of lauric fat to be consumed. Based on the upper end of the range, we see that this would entail providing an adult consuming 3,000 kilocalories a day with 52 grams of coconut oil (approximately 24 grams of lauric acid), which amounts to about 3.5 tablespoons of lauric fat. Menus can be constructed as shown in Chapter 5 of the *Nutrients And Foods In AIDS* book⁽¹⁾ to decrease the amount of dietary fats that do not enhance immune response and to increase the amount of dietary fats such as lauric acid-containing oils (coconut and palm kernel) and lauric acid-containing foods such as the coconut products mentioned above. **Editor's Note:** Many clinicians believe that if the HIV+ individual has established hyperlipidemia this may not be appropriate dietary advice for them. The author notes

that some early treatment of cardiovascular disease (articles published in the 1950s and 1960s) used coconut oil as successfully as safflower oil or other oils; perhaps because most of cardiovascular disease is caused by microorganisms that are now known to respond to monolaurin. Readers may find more information in several papers on coconut. The easiest to find is on the Weston A Price Foundation website <<http://www.westonaprice.org>> on the fats and oils page.

WHAT DID THE FIRST PROOF-OF-CONCEPT CLINICAL TRIAL SHOW?

Most research on the virtues of lauric-acid are basically in vitro studies. Almost all of the in vivo findings, with the exception of one clinical trial from the Philippines, were what would be considered anecdotal. Although the study has not been formally published, it was reported at a meeting last summer in India and is detailed below.

The first clinical trial giving monolaurin in capsules at two levels - 7.2 grams high monolaurin (HML) and 2.4 grams low monolaurin (LML)

or whole coconut oil (50 milliliters (coconut oil {CNO}) - as a source of the precursor of monolaurin to 15 HIV+ patients took place in the San Lazaro Hospital, Manila, the Philippines under the charge of Dr. Eric Tayag. The results of the trial were reported by Dr. Conrado S. Dayrit on July 25, 2000 in Chennai, India at the 37th Cocotech Meeting. The treatment-naïve patients, 10 females and 5 males, who were regularly being followed for their HIV status at the San Lazaro Hospital, were divided into 3 treatment groups (HML, LML, CNO) of 5 patients each. The patients were seen daily with laboratory values determined at the beginning and the end of 3 months and 6 months. At onset of the trial, the viral load of the patients as measured by PCR, ranged from 1.96×10^3 to $1,190.0 \times 10^3$ copies.

“Almost all of the in vivo findings with the exception of one clinical trial from the Philippines were what would be considered anecdotal.”

The CD4 and CD8 T-cell counts were measured by flow cytometry and at baseline they ranged from a low to a high, respectively, of 248 to 1065 and 570 to 1671. One male had a viral count too low to measure ($<0.4 \times 10^3$), which did not change, and he was not included in the final statistics. The final statistics included results for 4 males and 10 females and showed that 7 (2

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males, 5 females) of 14 patients had a reduced viral load at 3 months and 8 (3 males, 5 females) of 14 patients had a reduced viral load at 6 months. The reduced viral load was significant in only 3 (2 males, 1 female) patients using the log baseline minus log 6 months 0.5 criterion; 2 of the 3 were in the CNO group and one was in the LML group. The CD4 and CD8 T-cell levels increased in 5 patients but did not correlate exactly with a decrease in viral load. As a result of the encouraging responses in this small preliminary proof-of-concept trial, additional HIV-infected patients are being enrolled for a second larger and longer trial.

Editors Note: Please refer to page 7 for further information on the clinical trial. Additional information can also be found at the Center for Research on Lauric Oils, Inc. web site at <<http://www.lauric.org/>>.

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• **SEPT/OCT HIGHLIGHTS** •

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Editor's Corner

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topics. Features will also include comprehensive reviews of botanicals and dietary supplements with full references including popular web site addresses. *Update Central* is devoted to digests of current articles and news reports. It offers news on nutrition and complementary therapies. *Research News* relates timely information about HIV/AIDS, nutrition and clinical research. A scan of various databases and scientific journals brings you news of recent developments in these areas. *Nutrition Forum* holds practical advice to help clinicians working with HIV-positive people. This question and answer column offers you opportunities to ask specific questions and share the knowledge you gain with others. Reliable and experienced HIV-savvy nutrition professionals working in HIV/AIDS care answer clinician questions. *HIV Nutrition Update* continues to allow you to evaluate information that HIV-positive people are learning, which may not always be reliable. In addition, periodic

interviews, educational handouts and clinician tools provide useful and timely information on a variety of topics related to nutrition and HIV. Best of all, every issue contains valuable resources that will help you to become more knowledgeable about HIV/AIDS and nutrition.



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