Health Risks from Processed Foods and Trans Fats: An interview with Mary Enig, Ph.D.

PART III A Perspective on Fats and the Health Food Industry

by Richard A. Passwater, Ph.D.

Dr. Mary G. Enig, a nutritionist widely known for her research on the nutritional aspects of fats and oils, is a consultant, clinician, and the Director of the Nutritional Sciences Division of Enig Associates, Inc., Silver Spring, Maryland. She received her PhD in Nutritional Sciences from the University of Maryland, College Park in 1984, taught a graduate course in nutrient- drug interactions for the University's Graduate Program in Nutritional Sciences, and held a Faculty Research Associateship from 1984 through 1991 with the Lipids Research Group in the Department of Chemistry and Biochemistry. Dr. Enig is a Fellow of the American College of Nutrition, and a member of the American Institute of Nutrition. Her many years of experience as a "bench chemist" in the analysis of food fats and oils, provides a foundation for her active roles in food labeling and composition issues at the federal and state levels.

Dr. Enig is a Consulting Editor to the "Journal of the American College of Nutrition" and formerly served as a Contributing Editor to "Clinical Nutrition." She has published 14 scientific papers on the subject of food fats and oils, several chapters on nutrition for books, and presented over 35 scientific papers on food and nutrition topics. She is the President of the Maryland Nutritionists Association, past President of the Coalition of Nutritionists of Maryland and was appointed by the Governor in 1986 to the Maryland State Advisory Council on Nutrition and served as the Chairman of the Health Subcommittee until the Council was disbanded in 1988.

In the two previous issues, Dr. Enig and I have been discussing how the trans fatty acids formed upon the partial hydrogenation of vegetable and marine oils are being shown to be more harmful than saturated fats. Margarine and other processed foods rich in Trans Fatty Acids (TFAs) were once touted to be healthy choices for good diets, but now many researchers are recognizing that TFAs are more harmful than the natural butter and animal or tropical fats they replaced.

We discussed how the processed food industry tried to cover up this fact. As Rodney Leonard discusses in Nutrition Week, "The reputation that [hydrogenated] vegetable oil as the fat of choice in a healthy diet lies in ruins. And the real question is why the American health establishment did not act sooner to correct what may be the biggest scam ever perpetuated in nutrition and nutrition policy on the American public...These trans fatty acids were found to not only have more severe health consequences for persons at risks for heart disease, but also to increase the risk for individuals prone to certain types of cancer." [28]

We have let our natural diet be changed by processed food technology. The European Community has decided to limit TFAs to four percent of the energy source. Unfortunately, as Dr. Enig has shown, the American diet is closer to 10 - 14 percent, with some individuals consuming as much as 60 grams of TFAs daily. Let's continue to look into the trumped-up reasons given to us by food processors as why we should switch to TFAs, and then see what the truth is.

Passwater: Some "authorities" are implying that all saturated fats or animal fats greatly increase LDL cholesterol by shutting down LDL receptor production which consequently causes LDL cholesterol to build up in the blood, while they are also implying that all polyunsaturated fats or vegetable fats either lower LDL cholesterol or raise it only modestly.

Would you share with us your perspective of what we can accept as fact about saturated fat, monounsaturated fats, polyunsaturated fats and TFAs with respect to blood cholesterol?

Enig: This is a complex subject, that is difficult to explain in a few words, but I'll try to be brief. The current dogma on the effect of saturated fatty acids on LDL and LDL receptors is really an issue that is not satisfactorily clear-cut. It is not surprising that feeding different proportions of different fatty acids have different effects in different animals and different organ systems or tissues. Fatty acids are active components in regulating all sorts of homeostatic mechanisms in mammalian systems. But sometimes some of the basic research that identifies what is happening to one part of the cell does not really show what is going on in another part of the cell or in the whole person, and these reports have to be interpreted carefully.

I am concerned about the inconsistencies in interpreting the research. One example of such inconsistency can be seen when you compare some of the research with recent reviews. In a section of a 1980 report that measured the effect of dietary fats on LDL- cholesterol in humans, i. e., the effect of saturated and polyunsaturated dietary fat on the composition of LDL, the total cholesterol in LDL from feeding saturated fat was 59.1% (balanced is phospholipid and triglyceride) and the total cholesterol in LDL from feeding polyunsaturated fat was 59.5%. Not very different and certainly not higher than from saturated fat! These data are from the research of Dr. Antonio M. Gotto's group at Baylor College of Medicine. [29]

Given these findings, I have some real problems with the unreferenced or inappropriately-referenced statements in, for example, the recent chapter on regulation of LDL-cholesterol levels that appeared in the 1993 Annual Reviews of Nutrition. The statement was made that "... {fats} containing predominantly saturated fatty acids further increase the concentration of cholesterol carried in [the LDL] fraction ..." and that "... when fed at equal levels, saturated fatty acids are

more active in increasing the LDL-C concentration than are unsaturated lipids in reducing the concentration." There was no reference given for the first part of the statement; the references for the latter part (a 1957 paper by Dr. Ancel Keys et al and a 1989 talk by Dr. Mark Hegsted) are really inappropriate in my opinion.

Passwater: I see that you still tell it like it is. My next question won't be of interest to most of our readers, but I have to ask it because it will be important to other researchers. So readers please hang on for a brief moment while I get a tad technical, and then well get to the practical "take home" message.

Dr. Enig, how about the LDL-receptor?

Enig: Briefly, so much of the research on down regulation of the LDL-receptor appears to be done on cells like fibroblasts which are questionably appropriate. One report showed that down regulation of LDL-receptors by saturated fatty acids was considered a good phenomenon since the cell was a macrophage. In addition, any of the changes that are occurring in response to short-term feeding that are likely to be rearrangements of homeostatic mechanisms don't mean very much. I know that many feeding studies have been purposely cut off after a short term so that it would show something that would not show up in the long term.

As I said, I think this very complex area probably needs a whole article that delves into the meaning of the inconsistencies. Many people have interpreted these reports as meaning that people should avoid saturated fatty acids and consume more polyunsaturated fatty acids. It is important to know that historically no people had a high intake of polyunsaturates in their diets. This is really a phenomenon of the present century, and the evidence against the excess intake of polyunsaturates is mounting.

Passwater: Its ironical -- animal fats have been blamed for the damage caused by partially-hydrogenated oils -- which started out as wholesome vegetable oils -- that is, until they were chemically altered by man. I can't help but think about so many in the general public who are not scientifically trained and who have been brain-washed by the countless illegal commercials that promise that using margarine will protect them from heart disease. These people don't even read the newspaper accounts such as the report from Harvard that margarine actually is associated with increased heart disease and heart disease death. In the Harvard study of 85,000 nurses, after adjusting for all known possible confounding factors including total fat and total calorie intake, there was a fifty percent greater incidence of heart disease among those women with consuming the highest fifth of percentage of fats as TFAs compared to those in the lowest fifth. [3] Since all other factors, including total fat and total calories were compensated for, the researchers conservatively concluded, "these findings support the hypothesis that consumption of partially-hydrogenated vegetable oil may contribute to occurrence of coronary heart disease."

Then there is the recent report in the American Journal of Clinical Nutrition that found that the risk of coronary heart disease increases as consumption of vegetable oil rises. [30]

However, the years of newspaper, magazine and TV ads that falsely told them that margarine was good for the heart -- has made them think that it was true.

Now we are learning that mothers are giving their children soda or skim milk with their meals so as to avoid the fat in milk. They want to protect their children against heart disease by giving them very low fat diets in their youth. What effect is the fear of saturated fat having on the health of our children?

Enig: It is really unfortunate that children are being encouraged to drink low-fat milk instead of whole milk. In addition to the fact that milk is a good source of calories for growth (children actually need fat as an energy reserve so that the protein they are consuming can be well utilized for growth), there are a number of components in milk that are not widely appreciated. Milk fat globule membrane has anti-cancer properties and some of the fatty acids found in milk (and coconut oil) have anti-microbial properties.

Passwater: I am seeing reports that there appears to be a link between TFAs and obesity? Dr. Lewis H. Kuller has made such comments in Lancet, and Drs. Edward Siguel and Robert Lerman have indicated such a possible link in the American Journal of Cardiology. [31,32] I have also read discussions where TFAs have been called "the obesity trigger."

Enig: There was a report earlier this year at a major symposium on obesity that was held in New York, that the metabolic effect of increasing dietary TFAs changes characteristics of muscle cells that trigger the onset of diabetes and increasing obesity. I have not seen the actual research, but am looking forward to following it.

Passwater: Dr Enig, many of our readers are hearing about trans fats for the first time. Others may not be sure of what your message is regarding red meat, animal fat and vegetable oil. Would you give us a "take home" perspective regarding your advice on dietary fats?

Enig: The important thing to understand is that all fats are basically mixtures of saturated, monounsaturated and polyunsaturated fatty acids in different proportions. There isn't any real evidence that everyone needs to consume exactly the same balance of fatty acids, except that we do know that people need to take in at least 2-3% of their fat as the omega-6 fatty acids and at least 1-1.5% of their fat as omega-3 fatty acids. This means that smaller people expending fewer calories need fewer calories of each fatty acid and total fats than larger or more active people who consume more calories.

The fats that humans have consumed for millennia, such as the fats they added to mixed dishes, were almost always more

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saturated than they were unsaturated. It was the easily extractable fat or oil. The fat came from the animal, or, in the case of areas such as the tropics, it was the oil that came from the coconut or the palm fruit that was used in cooking. Sometimes it was one of the very stable oils such as olive oil or sesame paste that contained lots of built-in antioxidants and weren't too polyunsaturated.

People didn't really have the ability to extract oil from vegetables such as corn, or from many seeds as they do today. However, they got their essential polyunsaturated fatty acids from many of these plants when they were included in the foods they were eating. People used the intact leaf, root, nut, grain or seed along with all their antioxidants in the stews or the porridges that most people ate. This was the manner in which the polyunsaturates were historically consumed. The polyunsaturated fatty acids didn't have to be hydrogenated to protect their integrity and keep them from going rancid because they were consumed in a protected whole-food state.

People on low-fat diets historically consumed adequate amounts of essential fatty acids from foods such as grains, vegetables and nuts; and then they made their own saturated fat for the necessary structural adipose (structural body fat) and energy storage. Those people with higher fat intakes in their diets still had about the same amount of essential fatty acids, and ultimately the same amount of saturated fat for storage or as the energy source. Regardless of whether they ate it or made it, the fat in the tissues of our ancestors was relatively saturated, and therefore, the fatty acid supply to the tissues was predictably saturated. Today, with the high levels of partially-hydrogenated vegetable and marine oils in the diets of many people, the tissues and organs are faced with a new situation. Many researchers have now concluded that the presence of the TFAs is causing shifts in favor of chronic disease. Not a good situation!

The bottom line is to consume as many whole foods and whole food mixtures as possible. Since we live in a society where other people prepare most of the foods many of us eat, it is important to look for the least processed and the least likely to go rancid when it comes to fats and oils.

There is nothing wrong with consuming your essential fatty acids from oils as long as those oils are safely extracted and carefully stored, but a good balance needs to be maintained with sources of the more saturated fats such as the animal tallows and/or dairy fats for those who are not vegetarians, or the more saturated fats such as palm or coconut oils for those who are vegetarians.

Passwater: These facts will be hard to accept by those who have always heard just the opposite, and because of this constant repetition, they have come to believe the erroneous information. While we're on the subject of truth, let's shift gears for a moment.

You attended the Waxman hearing in July. What comments do you have to offer about the FDA efforts to limit nutritional products and information?

Enig: One major problem as I see it is that the members of congress and their staffs have only part of the information and almost none of the training to understand that the FDA is running with misinformation a lot of the time. But, if it suits their agenda, they will vigorously use it.

The supplement industry needs to be sure of its facts, needs to spend the time and effort to document these facts. The science is on the side of whole foods and rational supplementation. There is one thing that bothers me; as an expert in lipids I notice mistakes in many books, magazines and newspapers being made by "spokespersons" about the effects of fats and oils in health. I immediately discount the reliability of source of the information and suspect anything else that is being said. Sometimes I make allowances and can salvage certain facts and separate the wheat from the chaff, but others not so inclined, might not be so lenient. Since the FDA has a very biased attitude towards the whole foods and supplement industry, any erroneous written material that is put out by that industry or on behalf of that industry is considered grist for the FDA's mill. I hate to see the good apples spoiled because of the presence of a few rotten ones.

Passwater: There is so much that needs to be covered, and we didn't even get around to discussing omega-3 and omega-1 fatty acids. Perhaps you will be kind enough to chat with us again. I am sure that TFAs cause membrane abnormalities that can cause irregular heart beats and I want to pursue the research that suggests that TFAs trigger obesity. We are going to hear a lot more about TFAs in the future. It has taken 15 years, but I feel that the corner has now been turned and the momentum is building. The data can no longer be suppressed.

Your pioneering studies will have a major impact on helping people select better diets in the future. Now the public will have to deal with the fact that most junk foods are high in trans fat -- and this is a deadly reality that can not be compensated for merely by juggling other food components. Changing the ratio of polyunsaturates or saturates does not alter or compensate for the accumulation of trans fats. People will no longer be able to rationalize junk food as "just" being devoid of nutrients which can be replaced with supplements. People will no longer be able to rationalize junk food as "just" being high in fat which can be held in check by keeping the total dietary fat to 30% or less of total calories by selecting low-fat high-sugar foods. The reality is that there are only two healthy choices -- either get the trans fats out of foods and pseudo foods such as margarine -- or don't eat them. At least we can control the latter.

Dr. Enig, what are you looking into now?

Enig: I have submitted a proposal for a research project that aims to evaluate a specific nutritional support approach that I think will be extremely useful for individuals with HIV/AIDS.

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I am currently waiting to hear about the funding. I am presently preparing some of the research done by our group at the University of Maryland for submission to the appropriate scientific journals. I am also writing articles and a book aimed at correcting a lot of the misinformation that has been written about fats and oils. The working title of the book is "Know Your Fats: The complete primer for understanding fats, oils and cholesterol." The book is meant to be a comprehensive primer that would accurately explain what I have realized most people involved in nutrition don't really understand. I am also teaching short courses and workshops on lipids and nutrient-drug interactions. I fell that there is a great need for people with my training to continue to teach and consult.

Passwater: And, I am sure that you will continue to speak out for scientific truth. I can hardly wait for your book to be published. Thanks for taking the time to inform us about the dangers of trans fats in processed foods. I still admire your bravery in presenting the information in scientific forums, rather then taking the easy path of merely researching topics that are "politically" safe and don't risk losing funding or dirty tricks. I have always enjoyed our nutrition discussions through the years and look forward to more of your visits to the Solgar Nutritional Research Center.

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Trans fats of a particularly problematic type are also formed during the process of deodorising canola oil, although they are not indicated on labels for canola oil. Certain forms of trans fatty acids occur naturally in dairy fats. Trans vaccenic acid makes up about four per cent of the fatty acids in butter.Â These foods, said the AHA literature, should be made available to the consumer, "...reasonably priced and easily identified by appropriate labeling. According to one of the foremost research experts in dietary fats and human health, Mary Enig, Ph.D., thereâ€™s a case to be made for having as much as 50 percent of the fats in your diet as saturated fats for this reason. Thatâ€™s a far cry from the 7 to 10 percent suggested by mainstream institutions.Â Processing damages the oil, creating trans fats. Also, the oil is sensitive to heat, so if used at all, it should never be used to fry foods.Â Usually you canâ€™t go wrong with Olive oil and nuts, and by staying away from processed food. The final tip on Rapeseed oil, and Canola oil was very helpful. While I recognize it, I often forget the significance of Rapeseed oil in the ingredients list. Health Risks from Processed Foods and Trans Fats: An interview with Mary Enig, Ph.D. PART III A Perspective on Fats and the Health Food Industry by Richard A. Passwater, Ph.D. Dr. Mary G. Enig, a nutritionist widely known for her research on the nutritional aspects of fats and oils, is a consultant, clinician, and the Director of the Nutritional Sciences Division.Â She received her PhD in Nutritional Sciences from the University of Maryland, College Park in 1984, taught a graduate course in nutrient- drug interactions for the University's Graduate Program in Nutritional Sciences, and held a Faculty Research Associateship from 1984 through 1991 with the Lipids Research Group in the Department of Chemistry and Biochemistry. consumption of foods made with processed sources of trans. fats provides the most effective means of reducing intake of. trans fats. To meet the recommended dietary intake for fat i.e. amount corresponding to 20 to 35% of calories, most dietary. fats should come from sources of polyunsaturated and. monounsaturated fatty acids. Plant sources of polyunsaturated.Â Health risks of trans fatty acids. A low intake of fats and oils (less than amount. corresponding to 20% of daily calorie intake) increases. the risk of inadequate intakes of vitamin E and of essential.