

# **Cholesterol Is Not the Culprit:**

## **A Special Interview with Dr. Fred Kummerow**

By Dr. Joseph Mercola

**DM: Dr. Joseph Mercola**

**FK: Fred Kummerow**

**DM:** Heart disease is one of the leading causes of death, and cholesterol is frequently given the blame. But is that even justified? Hi, this is Dr. Mercola, helping you take control of your health. Today we are joined by Dr. Fred Kummerow, who is one of the leading pioneers in this area.

For nearly eight decades – yes, you heard me right – he has been researching the science of lipids, cholesterol, heart disease, and nutrition. Since the late ‘70s, he’s also studied the imbalance of nutrients in the American diet that lead to obesity. His new book, *Cholesterol Is Not the Culprit*, focuses on the basic chemistry of food, how your body works, and how food fits into the whole equation.

Welcome and thank you for joining us today, Dr. Kummerow.

**FK:** Thank you for asking me.

**DM:** I’m wondering, really from your new book, [if you can] give us some comments or some of the top five points that might surprise readers about your guide on how to prevent heart disease.

**FK:** Well, first, I show it in my book that you do not need a source of cholesterol to develop heart disease. We showed that in the pigs that have been born and then looked at by a pathologist, an MD and PhD pathologist from [inaudible 01:34], who worked with me during that brief period of time. They had shown that the pathology of the pig that was two and a half years old, the cells in their body, the cells in their arteries, had exactly the same kind of structure as the cells in somebody who had died of heart disease. That showed that you do not need a source of cholesterol to produce heart disease. We also showed that eating an egg did not cause heart disease.

In 1957, I had shown that people who eat partially hydrogenated fat and people who had been autopsied at that time contained trans fatty acids in their artery cells and in their other body tissue, too. I wrote that article, and it was published in *Science*. That was the first article that showed that trans fatty acids, which are present in hydrogenated fats, caused heart disease.

**DM:** What year was that?

**FK:** That was 1957.

**DM:** Wow. That’s 57 years ago. You were the first researcher to make that association. Now the Food and Drug Administration (FDA) is finally getting around to it, but not by its own accord. Didn’t you have something to do with starting a lawsuit against the FDA to label them or reduce the amounts in the American diet?

**FK:** That was very recently. But let's go back to the point where cholesterol really became the focus of [inaudible 03:52]. In 1975, the Federal Trade Commission (FTC) held a hearing on eggs. When [inaudible 04:03] asked me about eggs, I told him that eggs were a good source of nutrition. I didn't know what caused heart disease at that time. But all the physicians at that time testified under oath that cholesterol was the source of heart disease and that eating an egg would cause heart disease.

**DM:** Was this the McGovern Commission?

**FK:** The Federal Trade Commission is a government commission, yes.

**DM:** No, the McGovern. I thought they were...

**FK:** No, not the McGovern Commission. No. The McGovern Commission was for Senate, a Senate hearing. I wrote an article for that and said that a nutritious diet was needed and that cholesterol was not a source of heart disease.

And then what you're referring about is a very recent situation. In 2009, I had written a docket, which was about 3,000 words, asking the FDA to remove trans fatty acids and hydrogenated fat, those fats, from the diet. The hydrogenation of soybean oil, which goes back to 1910... The fat at that time was a very nice, smooth fat. It could be used to produce margarine and shortenings. It was used – that formulation was used from 1915 to 1965.

In 1968, when I was in a subcommittee of the American Heart Association, I told Dr. Moses, who was the medical director at that time, that I thought we should look at this more carefully, because data from Centers for Disease Control and Prevention (CDC) had shown that every year since 1910, death from heart disease increased to the point where it was now 600,000 deaths a year. I suspected at that time that it was caused by the presence of trans fatty acids in the diet.

The Institute of Shortening and Edible Oils agreed to lower the amount of trans fatty acids in the fat from 43 percent to 27 percent. I have gotten that 43 percent from a manager at the Proctor & Gamble company. Long ago, a margarine had at least 50 percent of trans fats in it. In other words, half of the fatty acids in that margarine were trans fatty acids. The trans fatty acids prevented the synthesis of prostacyclin. Prostacyclin is necessary to keep the blood flowing. Those people who were eating that margarine from 1910 to 1968 could not produce any prostacyclin, so their blood clotted and they died of sudden death.

The industry agreed to lower the amount of trans fats. After that, the death per 100,000, as shown by the CDC, gradually lowered again. There was an upper curve of increasing death. And then after that, what change occurred was again a decreasing death. But there were still 600,000 deaths in 2011. So, there are still too much trans fatty acids in the diet. That's why I wrote an article that was published in [inaudible 09:21] showing that if we could lower that to zero, there would be no more sudden death.

**DM:** Many of our viewers don't have advanced degrees in biochemistry. I'm wondering if you have developed a simplified explanation of what a trans fat is, so they can better understand that. We hear a lot about it, but from a structural perspective, it's confusing for some people.

**FK:** Okay. Structurally, trans fats are synthetic fatty acids. There are 14 of them that are produced during hydrogenation, during the making of this fat. They are not present in either animal or vegetable fats. They are solely present in partially hydrogenated fats. They prevent the formation of prostacyclin, which is necessary for blood flow.

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**DM:** Now, I thought there was one trans fat that occurred naturally. I think it's vaccenic acid in cow's milk.

**FK:** It is. There is. But this is an entirely different kind of trans fat. This might be very complex as far as your chemistry is concerned. But the chemistry shows that oleic acid, for example, which is in olive oil, has what is called a double bond. It breaks in the wrong string of carbons that are present in oleic acid. That position is at what is called 9 position. The fat in buttermilk or butter, for example, is at the position 11. The body works entirely different between those two. The 11 position causes no harm; the 9 position, when there's trans fat in the 9 position, it causes harm. It prevents the synthesis of prostacyclin.

**DM:** Interesting.

**FK:** It's a matter of complex chemistry that makes a difference. The Food and Drug Administration has for years confused those two fatty acids. One causes no problem; the other one does.

**DM:** Thank you for explaining that. I interrupted your description of the different surprising parts of the causes of heart disease or the issues that could help prevent it. If you could continue on that list, that would be great.

**FK:** We've published a paper recently. It showed that there are two lipids (what's called fats or lipids) in our diet: (1) those trans fatty acids that we're talking about that are in the partially hydrogenated fats. (2) The other one is produced by eating too much fried foods, the fat that is used in frying fats commercially, and you can even do it at home – these polyunsaturated fats. Lots of it is polyunsaturated. That means it's more easily oxidized. It's more easily changed into a fatty acid that gets into your blood and causes more thromboxane formation.

Thromboxane is the factor that clots your blood. You have prostacyclin that keeps your blood flowing, and thromboxane that clots your blood. You have to be very careful about the ratio, the amount of each in the blood. That's the simple explanation.

For the other factor, the other fatty acid, the other cholesterol, the oxidized cholesterol, that is present in your blood when you eat this kind of fat – more of that is present in people who had coronary bypass operations than people who didn't. That's one of the things we found. We had seven of these oxysterols in the blood, and two of them were found in rabbits fed cholesterol. There were five of them found in rabbits and seven in people. The two that were not found in the rabbits were found in fats that have been heated excessively. Powdered egg yolk, for example. We are eating these kinds of foods that contain these fatty acids.

The eating of foods that are fried in fats that have been overused is one source. The other one is the partially hydrogenated fat, the hydrogenated, the trans fatty acids. These two factors – rather than cholesterol – are responsible for heart disease. That is in publication online, and it will be in paper this month.

**DM:** Terrific. What is the journal?

**FK:** The journal is *Clinical Lipidology*, which is published in Great Britain.

**DM:** Terrific. You're a real pioneer. This whole myth got started 60 years ago or so (I suspect in the '50s). Maybe you can give us your perspective because you were there. You were one of the few people who actually witnessed it. As I understand it, the culprit, one of the primary culprits, seems to be Ancel Keys, who actually died about 10 years ago. Maybe you can give us your perspective on how this confusion persisted for so long on blaming cholesterol and not really focusing on the true causes that you

just mentioned – the trans fats and these prostacyclin imbalances. Can you share with us your perspective on that?

**FK:** Yes. In 1906, a Russian pathologist fed either cholesterol or eggs to rabbits. He found signs of atherosclerosis, which is the beginning of signs of heart disease, in the rabbits' arteries. That was interpreted as showing that cholesterol in eggs was responsible for heart disease.

Ancel Keys, I knew him very well. I had dinner with him one time. I know what his ideas were. But Ancel Keys would have grants from the National Institutes of Health (NIH). He once studied people in Finland in summer and people in Italy in winter. He came up with these ideas that people who ate more saturated fats and more hydrogenated fats had more heart disease as compared with people in Italy who didn't eat these kind of fats; they ate more fat from olive oil, for example, than fat from hard fats. Later, he had confessed that he was all wrong on what he was thinking. He did that before he died.

**DM:** He was partially correct, though, that he was vilifying the trans fats, the hydrogenated oils. But it seems that he confused it because he didn't separate or differentiate that between saturated fats and the trans fats. Would that be fair to say from your perspective?

**FK:** That's correct. He just confused the physicians because he said, at the beginning, that cholesterol was the cause of heart disease, and then he later retracted that.

**DM:** I'm curious, from your perspective again, how this one man had such a profound influence on the whole strategy and position of the healthcare system, pretty much on a global basis, in vilifying cholesterol and saturated fat and not understanding the true causes, which you elucidated almost 60 years ago.

**FK:** Well, that's because the physicians who had gotten their degrees at that time had no biochemistry in their training. They did not appreciate that it was biochemistry that was so involved in this whole picture than anything they did notice in comparison with different kinds of diets among people. That is still being done today. Physicians are still getting money from the NIH to compare one group of diets with another. Like eating more carbs or carbohydrates, for example, or eating more polyunsaturated fats like vegetable fats, and comparing that to the amount of heart disease they get.

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It's a very confusing picture because some of them would find that more carbs cause more heart disease, and that more polyunsaturated fats would cause less heart disease. The amount of the kind of fat you're eating doesn't make that much difference unless you ate the hydrogenated fats – that does. You're right. They didn't appreciate that the fats they were eating or using were both hydrogenated fats and animal fats. It makes a difference in the diets that they were feeding or that they were watching.

**DM:** Yes. It's, I imagine, relatively frustrating for you because of the method of dissemination of information when you were doing your research. Now of course, for the last nearly 20 years, we've had the Internet, so it's relatively easy to spread this information.

But you know, one of the missions of our site is to really take knowledge that's learned from really solid research scientists like yourself and help share them with people across the world, and not have to wait for the traditional model to widely accept and adopt these, so that we can really reap the benefits of the truth, really the truth in health, as far as the best can be discerned and not truth that's manipulated, twisted, or perverted by funding from corporate interest or the government. That's another area that is frequently an important part of this.

Certainly one of the areas that we're involved with is helping people understand the truth about GMOs. The challenge and tragedy there is the funding and also the patent issues. But essentially, almost all the leading agricultural universities have been captured by these companies that actually do the genes and patents, and sell the pesticides or herbicides like Monsanto. As a result, any researcher that's opposed to that isn't funded. It becomes a funding issue. They've complicated it by also putting legal issues on top of that with patents, so that it's actually illegal to do research even if you're self-funded. I'm wondering if you could comment on the funding challenges you had or continue to have in the research you're doing.

**FK:** I'm glad you bring up the funding situation because at the beginning of my career in 1955 when I came in the University of Illinois, I had plenty of money from the NIH. I was the principal investigator of five research grants. I have a training grant. I have a construction grant for the Burnsides Laboratory all from the NIH.

In 1975, when I acted as an expert witness at the Federal Trade Commission hearing, I was in opposition to what all the cardiologists at that time were saying. In 1975, I had a renewal of one of my grants, and I got a letter from the NIH saying that what I was going to do was okay. But I had not asked for enough money, so they weren't going to give me anymore. I never got another cent from the NIH because I differed with the cardiologists [on what they] were saying.

Luckily, I got support of high resource from the Wallace Foundation, who supported me for 28 years until H.B. Wallace died. And then I received no more money. The Weston A. Price Foundation stepped in, and the Hildebrand Foundation stepped in. I didn't have as much money anymore. I only have two people left who are still working with me in the lab actively right now. We're working on the cause of Parkinson's disease and Alzheimer's disease. But I have no fundings for that right now.

**DM:** That's an interesting observation or testimony as to what occurred in 1975. I'm wondering, you know. When I tried to tease out the details previously as to why almost a collusion existed on the persistence of the cholesterol myth, you ascribed it to the ignorance of most physicians as not having biochemistry in their training. But clearly, some of the leaders in the profession have biochemistry and some of them probably even have degrees in it. There's got to be some other variables, especially significant ones that could literally block your funding from the NIH. Do you think there were industry executives or influences that were a factor?

**FK:** I'm glad you asked that question, because after Dr. Cooper left the NIH... He was primary responsible because he had also testified. He had testified that an egg caused heart disease. I said I didn't agree with him at all. Little after he left, I had a call from a [Dr. Merrick 27:02], who was head of the program project grants. He asked me to put a grant in. He even helped me write an introduction to it. Unfortunately, he died two months before he retired, two months before his site visit. I had 15 site visitors. When I asked [inaudible 27:25] to take his place, out of the blue he said, "We were two years ahead of your site visit team. You can only be two or three years ahead to get funded."

Later, [inaudible 27:46], who was head of the NIH, asked me to quote a grant in for the center grant. I did. The center grant was then okayed by the researchers who look over the grants, the NIH's panel of 20 people in that particular area who were supposed to be experts in it. They all okayed that I should get the money. But then there's another factor in the NIH – it's called the council. The council is made up of lay people and scientific people together. The council would not agree that I should have the money. I switched the principal investigator to Dr. Schwartz, who was at the medical school, and he also got okayed for funding but again, the council didn't fund it. I don't know what happened in those areas.

Dr. Willett, who's at the Harvard Medical School, has written a letter to the editor of the *Journal of Nutrition*, which is published by the World Health Organization (WHO). He wrote a letter to them and said that I have been trampled on by powerful forces. I don't know who those powerful forces were. But

they certainly had enough power to keep me from... I don't know how this all happened. I can just figure....

**DM:** Well, they were successful. They don't want you to know. They don't want anyone to know. They're really clever. They're sophisticated. They have loads of resources, both financial and political, to manipulate the system to achieve their goals. That's exactly what they did. They delayed the inevitability of the truth from being disseminated to the people. As a result, hundreds of thousands, if not millions, of people died prematurely unnecessarily because of their suppression, and they were benefited to the tune of probably tens of billions of dollars or more.

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**FK:** Recently, the FDA has come to the conclusion on the basis of my...

**DM:** The lawsuit you filed?

**FK:** No. A lawyer, an attorney, had called me. See, after I had submitted this docket to the FDA, I was supposed to hear an answer from the FDA, and I didn't. They called me and said, "Did you even have an answer?" I was supposed to have an answer within six months. It's been three years after my docket.

**DM:** Two and a half years late.

**FK:** They violated the law. They were supposed to answer them. [He asked] "Would you mind if I sue the FDA in your name?" I said, "No, go ahead." That's what he did. That's what started Margaret Hamburg to comment last November 7 that she was considering banning trans fatty acids and hydrogenated fats. But again, she gave the industry 60 days to provide comments.

The industry said, "Oh, that wasn't enough time," because it was Thanksgiving, Christmas, and New Year, so they went on for another 60 days, which she gave them. By March 8, she was supposed to make up her mind. But in the meantime, she got comments from all the industries. One of the comments that were made by the FDA was that there are 30,000 items in our diet that contain trans fatty acids.

**DM:** Thirty thousand.

**FK:** Thirty thousand items.

**DM:** Wow.

**FK:** All these industries that are not using trans fat, they would want Margaret Hamburg to declare that trans fatty acids should be totally banned from the diet. Now the FDA is still looking over all those comments. So far, they've looked at 40 of them. You can see them from the FDA. They just watch as comments come along. They've got 1,500 comments. So far, they've looked at 40, which they've published. They still have a long way to go before they've gone through all those comments.

**DM:** Do you think another three years?

**FK:** I don't know how long it's going to take.

**DM:** Do you or your lawyer has some idea of an impression of if the FDA will rule favorably and ban them? Or do you think the industry will prevail again and manipulate the whole process, so that they can continue selling this junk?

**FK:** It all depends on people who will believe that the trans fat should be left on in the diet. There have been comments that said they should be left out. Most of the different comments favor leaving trans fat

out. I don't know who will win. It's up to the FDA and it's up to the public itself if they want to keep this stuff in the diet or not.

When you consider how many food items have it in... For example, the margarine industry had said, "Well, just leave in a little bit. Just leave in 0.134 grams in the diet, then you'd be okay." But all of them would leave in a little bit in the diet if they have to. There will still be an intake of between two and three grams a day. We will since keep having people die of sudden deaths. Now, in 2011, 325,000 died from sudden death, and that was not my estimate. We're just going to keep on [seeing] people die of sudden death.

Now, I've shown back in 1958, that if I fed a rat trans fat and then took it out of the diet, in a month, the trans fat will no longer be in that fat. In other words, the trans fat will all be metabolized out. There would be no more trans fat in the body. That would be true. If today, the FDA decided that no more trans fat should be in the diet, next month, people who have been eating this fat will have lost the trans fat. It would have been metabolized. There would be – next year and the year after – less death from sudden deaths.

**DM:** That's an encouraging piece of information to know and understand. Thank you for mentioning that, because the solution is to be careful of the foods that you're eating. The tragic reality, of course, is that 95 percent of the food that most Americans eat is processed. Processed food is where all this trans fat lies. [There are] 37,000 products with it, which is incredible.

But the key message here is that you don't have to wait for the FDA to make a ruling. You don't have to wait for the industry to respond. You can do this yourself just by changing your diet. That means eliminating all processed foods. That would include most restaurant food because if you're thinking they're not using processed foods, you've got another thought to consider, because that's not the case. Restaurant foods, processed foods – the key is to make your own food.

If you can eliminate that from your diet, put in fresh, locally grown vegetables, healthy fats, and animal proteins in appropriate amounts, you're going to be healthy. These trans fats are going to be removed from your system within 30 days. I think that's the key message: you don't have to rely on the government; you can do it yourself. But we still need to push for that direction because most people won't do that. They're going to continue to eat processed foods.

**FK:** I recommend in my book that for breakfast, you should eat an egg; cooked oatmeal or wheat bread (which you have soaked in water, so it's softer), a tablespoon of that; a tablespoon of yogurt; a teaspoon of nuts, crushed nuts like almonds and walnuts; some fruit, two or three different kinds of fruit (something colored because the colored fruits and even ones that are not colored, they all have antioxidant in them); two or three kinds of vegetables; a meat source (for example, beef, pork, chicken, fish, and sea life like crab or shrimp); and also cheese as a source of protein.

Now, there are also other ones called whole proteins. It contains all amino acids that your liver needs every day to work with and to produce all of the different thousands of kinds of chemicals in your body. The liver does that all. It's just a wonderful process that you can build from only a few things that you have to eat. You have to eat a complete source of all amino acids, which only are found in animal food products.

One of the physicians at the Cleveland Clinic has written a book, a 400-page book, about what you should be eating. He recommends only four eggs a week. He recommends grains like wheat, corn, and rice as the lowest source of proteins you should eat.

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All of those grains are incomplete in an amino acid called tryptophan. You need all of the amino acids in order to build the kinds of cells that you need in your body. You don't need much. But you need all those amino acids. You need two fatty acids called n-6 and n-3 fatty acids to build the cells in your arteries that make the prostacyclin (which keeps the blood flowing), and also those that cause thromboxane (which causes blood clotting). You have to have all these balances.

In addition to that, you have to eat a source of these four minerals – calcium, magnesium, sodium, and potassium. There are trace minerals, which are present in your vegetables, fruit, and in your meat. You don't have to worry about them if you eat a well-balanced diet. You'll have all of these factors that you need.

For dinner, I would say, as I explained, eat vegetables either raw or cooked, fruits either raw or cooked, meats, and milk products. By the way, I have a glass of milk at both breakfast and evening.

**DM:** Hopefully, it's raw milk.

**FK:** It's just the four percent milk that you get at the supermarket.

**DM:** Oh, okay. You don't have a source of raw milk?

**FK:** No. I don't know. There's very little raw milk available. You can buy it; you can get raw milk. The federal government will allow it, but it pounces on it.

**DM:** Right.

**FK:** Now, I don't really have any quarrel against anybody who wants to eat or drink raw milk. It's okay. But the way milk is produced, it's a good idea to pasteurize it. That preference is up to the person who wants to drink it.

**DM:** Sure. Yeah, if you're going to get it from commercial dairies, that certainly would be the case. But if you have a nice farmer who's got a few dairy cows, who treats them well, and who feeds them well, it may be reasonable to get some raw milk from them.

**FK:** Perfectly okay.

**DM:** You were largely responsible for finding the association of pellagra and niacin and the first person, the first researcher, to identify the fact that trans fat was a major cause of heart disease. You were the first person to discover that, which is amazing. That's an incredible discovery. Now you continue to do research. You're doing research in Alzheimer's and Parkinson's.

I'm wondering, as you approach a hundred years old... I mean, what impresses me about you is the sharpness of your mind, the clarity of your thinking, and the ability to recall the details. Your brain is still working really well. I mean, a lot of people get to be your age, and they just lose it. Alzheimer's, as most people know, it's an epidemic. The estimates are that one in three people will have it – which is frightening, to lose your brain.

I'm wondering if you could share any other insights on how to reach this level, to be a hundred years old, to still be active in your profession, and to have a sharp brain. Are there any recommendations other than the healthy diet one you just reviewed?

**FK:** I can tell you what I think: you have to have a healthy diet. You have to exercise every day. I used to go swimming at noon, have my lunch along, and eat it in my laboratory. I always went swimming at least a half hour. I bicycled, too. I bicycled to work from my house, which was by a mile away from my lab, every day. I believe exercising is important.

In my book, I have a way of exercising people. I tell them to take their pulse, exercise back and forth some place that's safe, sit down again, take their pulse, and wait until their pulse gets back to the original value. Do that for a half-hour or so. They will find that their resting pulse in the evening or at night will go down to 62, 64, or 65. They will go down from 72 during the day to that point. The heart is more relaxed and beating slower when the blood pressure gets lower. That's one thing that you can do. It's outlined in my book.

The book also tells what causes heart disease, how I got there, and all the different things that I did, like looking at veins that I got from Dr. Cook after his bypass operations. He took a vein out of the leg, and he used that as a repair around the blockages of the coronary arteries. I had bits of those veins left over that I had analyzed for their composition. I had shown that their composition had changed from what they were – from the placenta, for example, was only 10 percent. Veins and arteries from people who had been bypassed had 40 to 60 percent of what is called sphingomyelin.

Sphingomyelin is part of five phospholipids that surround the arterial cell to protect it. They changed during lifetime. The change came in because they ate oxidized fats, these fats that have been too oxidized. We pin it down to that. When half the artery was now sphingomyelin, the salt in the blood causes it to have a negative charge; the calcium in the arteries has a positive charge. The calcium then adheres to the wall of the artery and gradually causes the coronary artery to become calcified.

That's well-known now that it is calcification involved in this process, to the point where the blood can no longer flow through that coronary artery. The heart doesn't get the blood supply it needs, and it begins to ache. [Everybody] knows that. Of course, then you go to a physician, you'll get saved through a coronary bypass operation. There are 300,000 of them now a year in this country. So, it's important to keep your artery free of calcification. You can do that by not eating these oxidized fats. That's what causes that.

Of course, the other thing that I mentioned is that if you don't eat trans fats, you will not interfere with the flow of your blood. There will be nothing... The trans fats will have no influence because if you don't eat them, they're not going to be there. That's the other reason for heart disease. Both these components that you eat – the trans fat and the oxidized fat – if you just don't eat those, you won't have heart disease.

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**DM:** Do you think vitamin K2 plays a significant role in arterial calcification?

**FK:** That's not been proven. But I can tell you, I have a post-doc working with me who is working on vitamin K and vitamin D. He believes that vitamin D is not as damaging if you have vitamin K in your diet, too. Now, a physician at Harvard University has advised people (and other physicians are picking this up, too), to eat large amounts of vitamin D. That calcifies...

Vitamin D in small amounts is necessary. But in large amounts, we showed that in feeding our pigs... We fed pigs, even [inaudible 51:30], small pigs, for two months with excess vitamin D. We analyzed them, and they had more atherosclerosis and more beginnings of heart disease in their arteries than those that we have not.

My major professor was Dr. Steenbock at the University of Wisconsin. He was the discoverer of vitamin D in 1920. He took a patent on it. What he did was he exposed kernels of wheat to the sun. He fed those and compared them with kernels of wheat that he had not exposed to the sun. Those that had been exposed to the sun are fed to rats that did not have rickets. The [rats that he fed with] kernels he did not expose to the sun have rickets. He took a patent on that using irradiation to prevent vitamin D disorders.

The milk had to be run over a steel grid of as it was irradiated with vitamin D, and it produced 400 units of vitamin D per quart of milk. They had a patent. They also required the analysis of that milk to make sure it has vitamin D in it. That patent was declared not valid anymore by the Supreme Court in 1948.

But in the meantime, vitamin D has been made from cholesterol, which is by irradiating cholesterol. That was done by... The wool from the sheep was extracted, and it had cholesterol in them. That cholesterol was irradiated. That's the source of our present vitamin D.

**DM:** Yeah, I think it comes from the lanolin, doesn't it?

**FK:** The major part at the beginning. I don't know where it comes from now. But it was from Holland.

**DM:** No, the actual component in the sheep's wool is, I believe, lanolin, the fatty acid that they irradiated.

**FK:** There's lanolin in the sheep wool. But they isolate the cholesterol from that.

**DM:** Okay. All right, so that's how it's done. Thanks for those observations on vitamin D. I've been a long proponent of that to help people understand the importance of it. But I'm not a big proponent of people swallowing it. Your interesting comments and the studies that you did showed that you got arterial calcification if you got excessive amounts.

I personally have not taken oral vitamin D in over four years and get all of my vitamin D from exposure to the sun. When you do it that way, your body has a biofeedback mechanism, which regulates the amounts you can have. It's really difficult to get calcification due to excessive amounts of vitamin D, because your body has a part in it rather than forcing it down your throat in levels that it may not need or want.

**FK:** That's correct. The vitamin D assays were all done for me by the Food and Drug Administration at that time. In fact, we have an article that we printed out on their help in doing all our vitamin D assays. They did a lot of vitamin D assays on our food supply. By the way, when he died, he was not replaced. The FDA does not do any checking of vitamin D that's now in the market.

**DM:** Yeah.

**FK:** Put any amount of vitamin D you want in a pail, and there's no regulation of it.

**DM:** A good way is to get it from the sun or a safe tanning bed, which would also have the same self-regulating component and feedback mechanisms. I'm wondering, in closing, if you have any other comments you'd like to share.

**FK:** Well, read my book.

**DM:** Well, I want to give that recommendation, too. You were kind enough to send me a copy. There are a lot of books on cholesterol out there. No question. Dozens and dozens. But there's none that's written by the person who first figured out the true cause of heart disease or at least one of the true foundational causes – this exposure to trans fat – which you discovered 57 years ago. If you have any interest in cholesterol, I strongly encourage you to get Dr. Kummerow's book. It's available on Amazon. It really is a great read. It should be in your library.

**FK:** All of the physicians in Europe believe me, but physicians in this country are largely hooked up with cholesterol yet. The main treatment of cholesterol today is still to try to lower cholesterol level in the blood.

**DM:** Yes, indeed. Even one of those treatments, Lipitor, has generated far an excess of 10 billion dollars in profits for the company that makes it. We can see there's a strong financial incentive to perpetuate this myth. Additionally, of course, that's not even addressing the 300,000+ bypass surgeries that are done every year, I think at a cost of 50,000+ per surgery. You can do those numbers and calculate it. [There's] a very significant amount of revenue that are being invested in this myth.

**FK:** Certainly. A better control of what's happening in heart disease will pay off. We don't have to have... We won't be needing so much money for our healthcare. There would be less need for all of the money that we now have to pay to the healthcare people.

**DM:** All right, I couldn't agree more. I want to thank you for all your pioneering work and for your efforts to spread the truth and to help educate people about the foundational causes of one of the common causes of death in the developing world, which is heart disease. You're a real inspiration to all of us. I wish you the best.

**FK:** Thank you for asking me.

*[END]*