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Review Article

"The Diet Wars Challenge Study": Insulin Resistance, Cholesterol and Inflammation

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Abstract

The recently accepted publication by Lloyd-Jones., *et al*. [1] makes recommendations regarding the primary prevention of atherosclerotic coronary artery disease (ASCAD); recommendations, which are based upon looking at various factors which are credited with causing the inflammatory process associated with ASCAD. The primary author recognizes that as the author and creator of the "Inflammation and Heart Disease" Theory [2,3] shown in Figure 1, it is my primary responsibility to set the record straight. Not a record, which I have incorrectly stated; but rather, a necessary correction after so many others have attempted to explain their positions using my theory to support their point of view.

A correction that is clearly long overdue. So it falls to me to submit and have published this call for a new trial of the affect of popular diets upon the chronic inflammatory diseases plaguing modern society; chronic diseases which cannot be addressed merely by the treatment of surrogate blood markers even given the most recent recommendations [1].

In the last several years multiple social media sites have recruited both low fat and low carbohydrate dietary pundit movements. Like those before them, the groups encourage focusing on the limitations of the other groups dietary regimens while minimizing the limitations of their own, claiming to resolve any of a number of health problems while proposing that their opponents dietary regimens promote those same health problems.

The motivation behind "The Diet Wars" has been for the same reason all wars occur; money, power, prestige and while this approach may work in politics, religion and the social media networks of the day; it has no place in Science or Healthcare. A close analysis of the motives of these people show where the money is and it is disingenuous of these people to ridicule the pharmaceutical industry while seeking self-aggrandizement themselves.

Keywords: FMTVDM©℗; B.E.S.T. Imaging©℗; Breast Cancer; Heart Disease; Popular Diets; Primary Prevention; Secondary Prevention

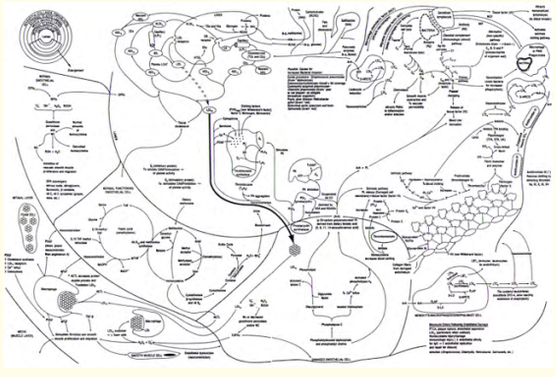

Figure 1: Inflammation and vascular disease theory [2].

Introduction

The primary author joined the American Heart Association (AHA) in 1976 and joined the Cholesterol Education Faculty shortly thereafter. Having taught and trained so many in Basic Cardiac Life Suppor (BCLS) and Advanced Cardiac Life Support (ACLS) I always smile when students are telling me about patients "risk factors" for heart disease, so it was no surprise to me when listening to a student talk about a woman who had just been admitted to the hospital the night before that the student ran down the list of "risk factors" for this woman. Yes, she was in her 40's (age), but she was a woman (the number one cause of death in women is actually heart

disease), without a family history of heart disease, she didn't have high blood pressure, her cholesterol and lipid levels were all well below the acceptable levels for risk, she wasn't overweight, she didn't have diabetes, she exercised, she didn't smoke. She didn't appear to be a type A individual and she was following what at the time was considered a "heart healthy" diet only occasionally drinking alcohol.

I asked the student why he was running through all these risk factors for me and he told me it was important as it helped determine her risk for heart disease. I then asked him what he could conclude from the risk factors he had just presented and he said, she shouldn't have heart disease. Brilliant I thought; I then asked him what he thought about her cardiac enzymes and the series of electrocardiograms we had run since her admission and he said, she's had an inferior wall myocardial infarction. So we have a woman who according to the "risk factors" shouldn't have had a heart attack but did; right I said? Yes, he admitted. My final reply, "What's the point of running through a list of possible reasons for why someone should or shouldn't have heart disease when we know for a fact she does?" "What's your point?".

This is the same type of faulty reasoning occurring with "The Diet Wars." There is such a desire to impress and be seen as right, that those involved are willing to do anything, except that which will expose the truth – see "The Diet Wars Challenge" at the end of this article.

For many but not all people, this is the fundamental problem. Studies looking at the impact of medications, procedures, surgery and even diet, had focused on the impact these treatments have on these various risk factors and now the emphasis has been focused on the surrogate blood markers in my "Inflammation and Heart Disease" Theory; which I will address below.

I too, for too many years focused on these types of questions and measurements, only to realize that like the medical student trying to understand why this woman who shouldn't have had a myocardial infarction, what lay people call a "heart attack," had actually had a rather extensive one absent any real "risk factors" for heart disease. What does this mean regarding our ability to measure and use these surrogate blood tests and risk factors to determine if people truly have heart disease?

After attending a recent Cardiovascular Conference and listening to discussions on "Artificial Intelligence" (AI), I am less convinced people know what AI is. Most of the discussion focused on collecting larger and larger databases with information calculating the numbers of people having heart disease based upon "qualitative" imaging test results and surrogate markers of disease. The concept was to add all this information together so you could better guestimate the likelihood that someone has heart disease or breast cancer or whatever disease you were trying to find.

From my perspective, this is exactly what meta-analysis papers are. They are not scientific research. No real research is being done here. They are the accumulation of the information and "mistakes" present in a multitude of other papers, without the true appreciation of the mistakes made. One type of mistake in one paper, another type in other papers all put together under the assumption that the collective errors assembled into one paper now finds the truth.

This is also one of the problems present in multi-center trials where variables exist at one institution, absent at another. The study is a collection of multiple differences not defined but cumulatively necessary to obtain a statistical outcome that can be "published." True differences are apparent in smaller studies because statistical differences actually exist. The ability to find a statistical difference is either because there is a true statistical difference or there is no appreciable difference and only the inclusion of "massive" numbers of people in a study can make it look significant.

You've heard the expression two wrongs don't make a right; well such papers would suggest that adding a lot of incorrect or partially correct information together including "qualitative" imaging tests which we know are flawed with "inattention blindness" and calibration errors, would somehow be an improvement. It's just another set of "risk factors" being thrown into the mix of what has become a healthcare cauldron.

This is exactly what the medical student was trying to do with the woman. Putting the pieces together based upon what we expected to see and calling it probability; the probability that this woman had heart disease; except this probability didn't represent an actual "quantitative" measurement upon which to place the probability. The AI frequently discussed now in the media and literature is nothing more than what the medical student was doing, only faster.

In the end he was wrong and these guestimates of heart disease and measurements of surrogate blood markers in people, are being using to guestimate heart disease instead of actually quantifying it, including the diet studies, and they are consequently wrong for the same reasons.

Let's now turn our attention to Insulin Resistance, Cholesterol and Inflammation, beginning with Insulin Resistance, a term that people think they are familiar with but are probably using and measuring, at least to an extent, incorrectly.

Insulin resistance

Insulin resistance is a term bandied about by many people today. It's become a mantra for some people. There are a variety of ways people look for insulin resistance, including again, blood tests. Many people have focused on looking at the ratio of triglycerides (TG) to high-density lipoprotein cholesterol (HDL); TG:HDL. This ratio is essentially the ratio of "fats" to "good cholesterol." "Good cholesterol" (HDL) is a scavenger molecule of which there are actually three varieties depending upon how much they have been scavenging; HDL1, HDL2 and HDL3. This approach to "insulin resistance" became popular after it was noted that white overweight individuals with TG:HDL ratios greater than 3 were more likely to have "insulin resistance." It is NOT however an actual measurement of Insulin Resistance; it is an inference.

Too much insulin, the result of either a tumor, iatrogenic causes, or increased levels of caloric intake, primarily resulting from increased glucose and other sugars, frequently the direct consequence of refined carbohydrates, is clearly not providing a health benefit. Simply replacing fats with refined carbohydrates was never an intelligent decision and it was never claimed to provide a health benefit; it was a marketing scheme designed to keep consumers interested in foods once the fat content was reduced. As you undoubtedly know, two wrongs don't make a right and this is a classic example of such. In fact, long before diabetes mellitus is present, we [4] showed (Figure 2) that even in the pre-diabetic range, there was an increased risk of vascular problems including cerebrovascular accidents (CVAs; aka "strokes) and transient ischemic attacks (TIAs; aka "mini strokes) occurring in Veterans long before classic diabetes mellitus was diagnosed. As shown in the Kaplan-Meier Morbidity graphic, individuals with higher blood glucose levels had a greater incidence of such vascular disease [4] even before they were considered to be diabetic or insulin resistant.

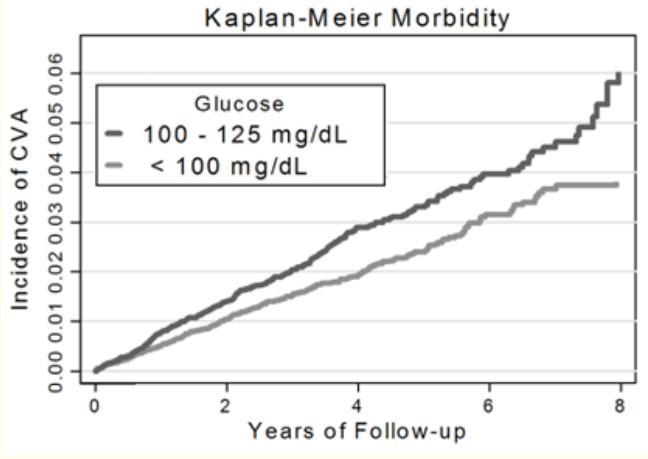

Figure 2: Increased levels of fasting glucose are associated with increased risk of cerebrovascular accidents (CVAs).

Furthermore, HDL is nothing more than a scavenger mechanism. There are groups of people who have HDL's in the 10-20 mg/dl range (considered very low) who have no heart disease because their LDL levels are well below 60 mg/dl (again considered low) suggesting a "possible" species limit to significant disease potential, although even this would not "guarantee" the absence of disease in everyone; while still others have HDL's in the 70-90 mg/dl range (considered high) who develop inflammatory plaques in their coronary arteries and go on to have heart attacks. Additionally, there are still other people who have dysfunctional HDLs, so dysfunctional, that their production of HDL is greater and subsequently elevated to address the fact that their HDLs are not functioning properly. In fact, absent the A-1 Milano group, there is little if any scientific evidence that HDL does anything more than just moving the lipids (see below) around.

What is insulin resistance? All food once ingested, be it protein, carbohydrate, alcohol of fat causes the release of insulin from specific cells in the pancreas called the islets of Langerhans. In fact, the term insulin actually comes from the Latin term, Insula, which means island. The major difference in insulin response shown in Figure 3 between the various types of food you eat, is how much insulin is released and how rapidly it is released.

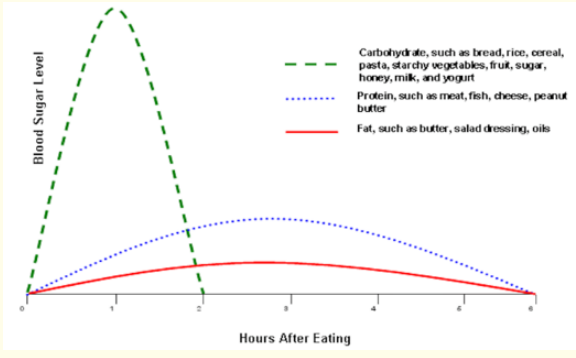

Figure 3: Insulin is released in response to the type of food eaten.

There is no question that the more elemental or refined the food is, the more rapidly the food will be broken down into its elemental components, independent of whether those food sources are plant or animal based. Once broken down carbohydrates as monosaccharides, proteins as amino acids and fats as fatty acids, all (Figure 4) are converted to acetyl coenzyme A within the cells of your body, where it is converted into adenosine triphosphate (ATP) within the mitochondria of the cells of your body. ATP is the final energy source needed to power the cells of your body so they can do their individual jobs.

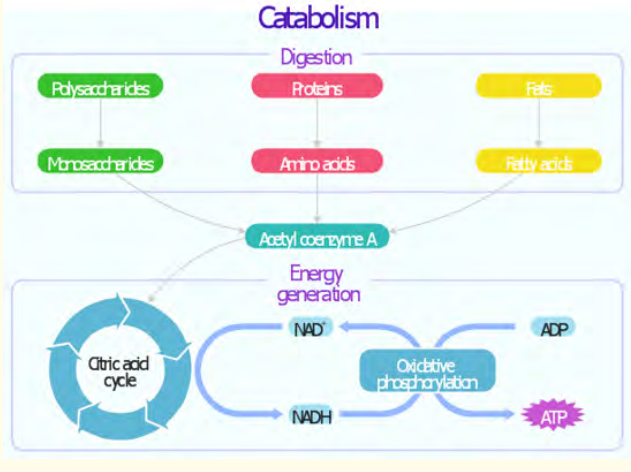

Figure 4: The final common catabolic pathway of foods towards the production of ATP.

Excess energy from the consumption of more food kilocalories (commonly referred to as calories) than needed is either stored in your liver as glycogen for more immediate needs or within other cells of your body as "fat" for future needs.

Down regulation of insulin receptor sensitivity

In the end, as shown in Figure 5, the introduction of glucose into the cells of the body is accomplished through the glucose-insulin-potassium receptors.

Figure 5: The glucose-insulin receptor is ultimately responsible for the entry of glucose into cells.

The cells within your body not only recognize how much glucose is in the blood stream but also how much is within the cells themselves. Under what we classically consider to be standard conditions, ours cells are in need of new energy (ATP) sources and are receptive to receiving more glucose from which to make the ATP. However, once the situation exists where the cells are no longer in need of energy sources and yet there are excess energy sources within the blood stream, the insulin receptors become less responsive.

This resistance results in more and more insulin being required to get the cells to accept more glucose, which they already have sufficient supplies of. This process is called "down regulation" and it is what "insulin resistance" truly is. The treatment for this is not the addition of more insulin or medications designed to increase insulin output by the pancreas but simply to reverse the phenomena. This is accomplished by decreasing caloric and glucose intake, resulting in less available glucose for the cells,

resulting in depletion of the cells glucose and the need for the cells to obtain more glucose and energy substrates. Consequently the cells insulin receptors increase their responsiveness and uptake of what glucose is available in the blood stream improves with insulin receptor sensitivity normalizing.

Notice that the solution is not simply switching from one type of food consumption to another; viz. fat for carbohydrates, but the overall reduction in caloric intake and refined processed carbohydrates to promote an environment where the cells need to become more insulin responsive, resulting in less insulin needing to be produced by the pancreas to accomplish glucose uptake by cells.

Those who would argue to increase fat consumption in the place of carbohydrate consumption to address the problem are the same people who originally said it was wrong to switch fat consumption for excess carbohydrates; particularly refined carbohydrates. Simply switching one source of excess for another does not solve the underlying problem, it merely exchanges one set of problems for another. Those who argue that fat is the problem but have ignored or promoted increased carbohydrate, particularly refined carbohydrates intake in the place of fat have not solved the problem either; they have merely replaced one problem for another. I have frequently said you don't solve the problem of what you put in your mouth by putting something else in your mouth, you solve it by not putting the first thing in your mouth.

Ancel Keys and the U.S. Government

While it is true that the U.S. Military's selection of Ancel Keys as its expert was simply the result of only having two people to choose from with high-altitude data on human caloric requirements, the initial observations about differences in death rates and what actually turns out to be "saturated" fat, not cholesterol per se, are still valid.

So too is the conscientious objector "confinement" data obtained by the U.S. Government during that same period of time, which determined the overall impact of caloric, protein, carbohydrate and fat intake and restrictions and the subsequent ability of those individuals to perform specific tasks; and the impact upon overall body weight and muscle mass, resulting from these "starvation" investigations. Our focus should be to learn not just from part of what we have learned but to learn as much as possible from all the information acquired over the decades.

We're really NOT talking about Cholesterol, we're talking about lipids

Cholesterol is a specific molecule, but when we talk about cholesterol in the blood stream, we are typically NOT referring to cholesterol itself, a hormonal precursor made in the adrenal gland but rather a combination of cholesterol, proteins and triglycerides (fats) [5]; collectively called lipoproteins or frequently shortened to lipids; these are commonly and incorrectly referred to as cholesterol.

This is in fact one of the first clues you need to understand to appreciate that someone does not fully comprehend what they are talking about when they discuss cholesterol and then suggest it is not related to coronary artery disease. Your next clue is when they refer to the problem as one of "insulin resistance" and they describe insulin resistance as the ratio of one lipid to another; viz. TG to HDL. It is unconscionable to say lipids have nothing to do with heart disease and then to use the lipid levels to describe "insulin resistance" and say, this is what causes heart disease.

We describe these different types of lipids as low-density lipoprotein cholesterol (LDL), intermediate density lipoprotein cholesterol (IDL), high-density lipoprotein cholesterol (HDL) of which there are as already mentioned essentially three types depending upon how saturated they are, very low density lipoprotein cholesterol (VLDL) and chylomicrons (essentially triglycerides; fats). In fact, when we speak of the liver producing "cholesterol" what we are actually saying is that the liver is making VLDL, which is mostly triglycerides (fat).

Collectively, as shown in Table 1, these various lipids result in 6-different types of lipid problems depending upon the specific type of lipid abnormality we are talking about as shown in the table below.

These terms are not derived from their biological effect but rather are the result of what was first observed in clinical laboratories when blood samples with elevated lipids were "spun down" leaving only the serum and layers of the different densities of lipids. That which settled to the bottom of the test tube was the densest, HDL, with LDL above that, IDL above that, VLDL above that, with chylomicrons being the least dense, floating to the top of the test tube.

Type	Disorder	Cause	Occurrence	Elevated plasma lipoprotein
I	Familial hyperchylomicronemia OR Primary hyperlipoproteinemia	Lipoprotein lipase deficiency OR Altered ApoC2	Very rare	Chylomicrons
IIa	Familial hypercholesterolemia or Polygenic hypercholesterolemia	LDL receptor deficiency	Less common	LDL
IIb	Familial combined hyperlipidemia	Decreased LDL receptor	Commonest	LDL and VLDL
III	Familial dysbetalipo-protenemia	Defect in Apo E-2 synthesis and increased ApoB	Rare	IDL
IV	Familial hypertriglyceridemia	Increased VLDL production and decreased excretion	Common	LDL
V	Endogenous hypertriglyceridemia	Increased VLDL production and decreased Lipoprotein lipase	Less common	VLDL and chylomicrons

Table 1: The classification of abnormal lipoprotein disorders.

The greatest problem in using the various blood cholesterol lipid measurements to assess the risk of heart disease for any given individual is (1) related to the individual differences (below) in how effectively any given individual metabolizes these lipids, something not measured with these blood tests and (2) the reality that these lipids exist primarily within the cells of the body and are not flowing freely throughout your bloodstream. It is within the cells of your body and within the walls not the lumen of the coronary, carotid and other arteries of the body, where these "inflammatory" plaques reside, which will eventually rupture; leading to the real damage, the final heart, brain, kidneys, liver and other end organ damage leading to morbidity or mortality.

In fact, roughly 85% of the body lipids, those that cause this end organ damage of MI, CVA, CANCER or other inflammatory diseases, lie inside the cells proper. This is where the lipids reside and this is where they cannot be measured absent tissue biopsy of those organs to measure the internal lipid levels. As this is both invasive and we have no real data to assist in the clinical decision making process using this approach, we are limited in the information this actually provides us.

This is also another reason why knowing the woman's cholesterol level did not help the medical student in his assessing her risk for having heart disease. In fact, during conditions of "stress" and having a myocardial infarction would certainly qualify as a condition of stress, the blood epinephrine and cortisol levels increase; increasing your glucose levels and reducing your blood lipid levels; making the measurement of blood lipid and glucose levels during this period of time completely unreliable as markers of your "baseline" risk status.

"Inflammation and Heart Disease"©.

Unlike in 1999 when the primary author introduced the Theory of "Inflammation and Heart Disease" [2,3] and in 2000 when I explained that Angina [6-10] is caused by regional blood flow differences and not simply the result of a narrowed coronary artery lumen which can lead to regional blood flow differences; these Theories and concepts are now commonly accepted by many. Including the recognition that angina is due to vascular regional blood flow differences, which with rupture of a vulnerable inflammatory plaque and thrombus formation lead to what is now referred to as a "type I" MI, while in the absence of plaque rupture, the result is what is now referred to as "type II" MI. Type II MIs having a statistically significantly poorer survival that type I.

Despite the recognition of both the "Angina" and "Inflammation and Heart Disease" Theories, there appears to be little true understanding of either theory, with Physicians continuing to measure the blood surrogate markers and define patients heart disease based solely upon those surrogate "Inflammatory" Markers/Factors. Such clinicians assume these surrogate markers are actually measuring heart disease itself and treat their patient's angina without recognizing that their treatment is only reducing regional blood flow differences and not actually improving overall coronary blood flow, which is after all what is really needed to improve overall cardiovascular health.

It is almost impossible to pick up an article on "Inflammation and Heart Disease" and not see someone showing a cute little cartoon about an artery on fire and while imitation flattery may be the best form of flattery, there have been way too many people manipulate the data for their own purposes, not staying true to the Theories. It is not a compliment and it does not promote or advance the understanding of inflammatory health care problems by misrepresenting the Theories; particularly when the components of the theories are incorrectly explained and manipulated. Such actions MANDATE that the primary author respond to correct the literature almost 20-years later and to address the limitations in current studies, including Dietary outcome studies.

Biological systems are intricate and by that I mean they have evolved to provide a survival benefit, which includes responding to biological insults to keep the organism alive. They are not simple single gene responses and since much of the body's inflammatory mechanism determines life or death, it has multiple complex back up systems to prevent death should one of the components fail to work adequately. Absent such a back up system only a single failure would be required and such a system would be biologically extinguished.

These biological insults undoubtedly originally began with a combination of genetic and environmental factors initially beyond human control. Unsuccessful survival mechanisms lead to the extinction of those individuals with such inadequate systems resulting in that genetic material no longer being passed on. By contrast, successful response was evolutionarily rewarded by perpetuation through offspring and survival of the species.

Over time, as humans have "evolved", one can question whether this is such a good term considering the evolution of our chronic disease states and what appears to be a continual set of behaviors which appear determined to extinguish the species, we began to impact our environment(s) more and more; changing our living conditions, including reducing our need to physically perform manual labor tasks and the introduction of higher caloric sources of food, exceeding our biologic needs.

For over a hundred years, at least as far as modern humans are concerned, there has been considerable debate and discussion regarding those diseases most likely to kill us and why. Prior to the introduction of modern antimicrobial disease theory, therapy and antiobiotics, by (1) Dr. Ignaz Semmelweis who had to endure the criticism and attacks of his "peers" only to be recognized for his significant contribution to medicine after his death and (2) Dr. (Sir) Alexander Fleming for his discovery of penicillin, the number one cause of death among people was infectious disease.

Changes occurred during and around WWII, when increased caloric sources and lifestyle changes resulted in an increase in heart disease. During WWII itself with the institution of rationing, heart disease itself retreated, albeit only for a brief period of time.

By 1976, the primary author had joined the American Heart Association (AHA) and was soon on the Physician Cholesterol Education Faculty. AHA had taken the position that based upon Ancel Keys and others work along with certain epidemiologic information, that it appeared that cholesterol was the primary cause of heart disease.

During the next two decades as the primary author completed his medical training and participated in several studies on the impact of diet and heart disease, I became concerned that we were missing valuable pieces of information; not the least of which was that it wasn't "cholesterol" per se which was the culprit for Heart Disease but rather the individual lipids themselves responsible for the buildup of inflammatory plaques, of which I have written more than enough papers and presented findings at more than enough Scientific Conferences.

That being said, during the mid-1990s I began my search for the causes of heart disease. This search included reading and investigating hundreds of published papers, which in addition to my own work, eventually lead me to conclude that there are a myriad of factors, that to varying extents in different people, account for the development of "Inflammation and Heart Disease" as well as Cancer [2], Diabetes Mellitus and other modern Chronic Diseases.

To that end, my work which began with the Physician Cholesterol Education Faculty, evolved over time into the Fleming Unified Theory of Vascular Disease (FUTVD) or if you like the "Inflammation and Heart Disease" Theory (© 1-655833842, TX-7-451-244), which included LDL; VLDL; HDL; TG; weight; homocysteine; lipoprotein(a); fibrinogen; growth factors including insulin; interleukins; exercise; the complement cascade system; bacteria, viral, fungal and other infections; and antioxidants to name a few. The Theory considered the implications and effect of these and other various factors as they related to Heart Disease, Cancer, Diabetes, Hypertension and a number of other Chronic Inflammatory Processes.

The end result was a recognition that these multiple factors account for approximately 67% of the impact upon these diseases but more importantly, the recognition that any given individual has a unique biologic set of factors, and it is the individual's specific response to those factors, which determines the final outcome; a final outcome which is not measured simply by measuring these factors.

While investigating [11] changes in these various surrogate blood factors/markers and comparing the changes in these factors over time, with changes seen in ischemic index (II) of coronary blood flow; the semi-quantitative measurement of coronary artery disease available at the time; the results showed there was no relationship between the actual measured surrogate factors, which are responsible for ultimately producing the inflammatory changes and plaques, with the end result of impaired coronary regional blood flow itself, resulting from the inflammatory plaques. This is demonstrated in the following graphic of the outcomes relationship comparing the blood profiles of these inflammatory surrogate markers and actual coronary artery disease (II).

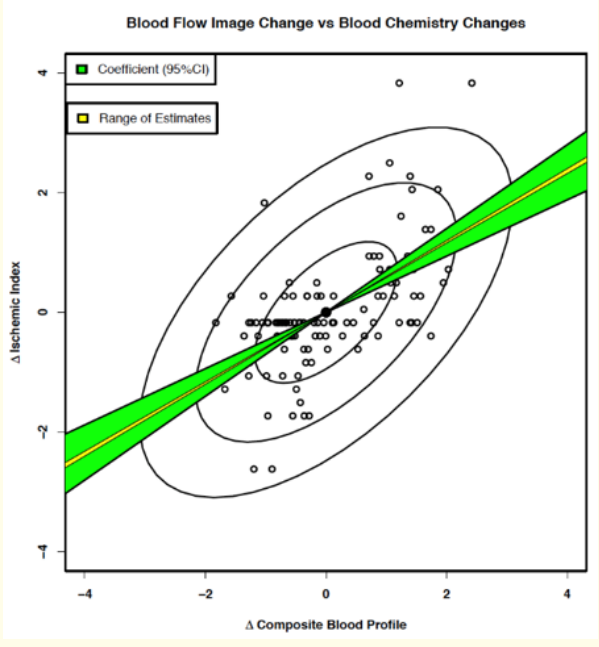

Figure 6: There is no relationship between changes in quantifiable coronary artery disease and measurable changes in surrogate blood markers frequently tested for and treated under the new guidelines [1].

It is in fact the final outcome and not the measurement of any one or more combination of these factors, which is the most important question to answer when asking if there is Heart Disease, Breast Cancer or any other particular health problem and whether treatment has improved or worsened that problem.

Having recognized this as a significant limitation by the late 1990s, the primary author had already begun working on the development of a truly quantitative method for measuring the final outcome of these inflammatory diseases [12] by providing an absolute quantification of regional blood flow and metabolic differences in tissue, through calibration, quantification and theranostification. A test, which not only accurately, consistently and reproducibly measures what it is looking for, regional blood flow differences (angina and inflammation) and metabolism, but importantly also a test without qualitative human errors, including "inattention blindness", data loss and reader bias.

Why ALL dietary studies to date are flawed

For decades we have been modifying the foods people consume and wondering about the effect these foods might have on the overall health of people. It is thought that obesity resulting from our increase caloric intake and our decreased caloric output (physical exertion) is now the major contributor to our incidence of Heart Disease, Cancer, Diabetes Mellitus and multiple other chronic inflammatory processes. How we have gotten to that state is one of debate.

Studies, which have looked at the various surrogate markers detailed in the "Inflammation and Heart Disease" and "Angina" Theories have failed to lead to helpful conclusions. The reasons now should be obvious to the reader. It is not a flaw in the Theory but rather a misapplication of the theories failing to recognize the full meaning, application and implications of the Theories and the work, which went into developing them.

Like many other problems present in today's society, there appear to be major polarized opposing groups each insisting they have the answer, while claiming the other extreme has produced the problem. It is impossible with today's "social media" to avoid the onslaught of articles, some scientific, many not so much, supporting each position. None of these articles however actually measure/quantify the diseases in question; viz. Heart Disease and Breast Cancer nor the treatment effects.

A classic example as shown using FMTVDM, the Breast Cancer Component (B.E.S.T.) demonstrates how soy protein in one woman improved her breast health while in another women the soy product was associated with a worsening of breast health. It is this quantification of outcomes that is badly needed to answer the question of the impact of these diets upon both Heart Disease and Breast Cancer.

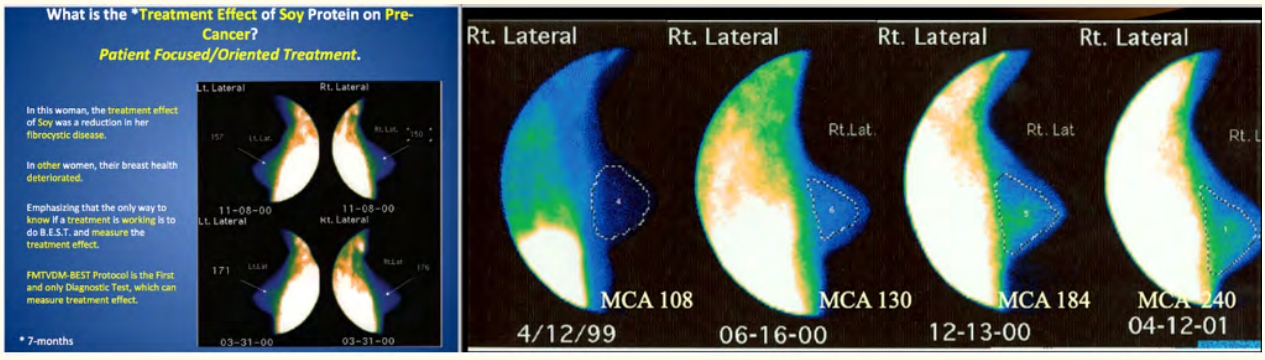

Figure 7: Quantified measurement of breast cancer using B.E.S.T. Imaging.

Due to the lack of quantifiable end organ outcome information (Heart Disease, Breast Cancer), the results of the myriad of diet studies have depended upon the less than completely reliable qualitative imaging studies, and measurement of surrogate blood markers/factor and changes in weight alone; merely fueling the fire of debate while failing to quench the fire of inflammation responsible for heart disease and breast cancer plaguing modern societies.

The Diet Wars Challenge: A time to measure the consequences resulting from popular diets

Our most recent publications [13] were met with so much resistance by "both ends" of the diet debate, that one paper was even pulled from publication despite providing the raw data to the publisher demonstrating data validity. This second paper was later published elsewhere [14] and has even been reprinted by permission in another journal of nutrition [14], demonstrating the demand for scientific answers. These studies [13,14] clearly demonstrate the ability of people to following dietary changes for longer periods of time with appropriate dietary counseling and Bandura self-efficacy counseling. In the end, this type of publication bickering has hearlded the importance and in fact the ethical and moral NEED for a new type of diet study; one in which we actually measure the end point in question, viz. coronary artery disease and breast cancer and not rely on diet diaries, changes in weight or surrogate blood tests.

One of the common complaints in almost every, if not every, diet study is a question of bias. Those who have any publications to date have already drawn some conclusions but those conclusions as mentioned are severely limited by the outcome measures of qualitative imaging, weight loss and the measurement of surrogate blood markers which as has been noted above, does not show the actual quantitative changes in Heart Disease or Breast Cancer which truly occur.

Coupled with the ever-present concern that those conducting the dietary arms of many of the published and unpublished studies are undoubtedly not doing as good a job of instructing individuals on the diet as those who "believe" in the diet, it is important that such a quantitative study be done with the dietary arms of the study to be carried out under the direct supervision and control of those who are ardent proponents of each given dietary regimen; thereby removing this as a concern.

To that end it is very clear that if we are to get to the bottom of this diet debate, if we are to truly determine what impact these diets are having on true disease outcomes, then we need a prospective dietary study, where the diet pundits in the respective camps become responsible for instructing and monitoring the activities of their participants. If no one can conduct a proposed dietary philosophy as well as those who worship at the alters of that diet, then they should and must be the ones to control and subsequently be responsible for writing up and living with the results of the study.

Each group should measure the same outcomes. If they wish to measure weight, BMI, the surrogate blood markers, urinary ketones, respiratory quotients, whatever they want to obtain information on, they should do so, but all dietary groups should measure the same thing, so results can be compared between groups once the study is completed.

The only requirement is that all participants, independent of what dietary group they are following must undergo FMTVDM; FMTVDM-B.E.S.T. Imaging [2] to provide truly quantitative data as to the extent of heart disease and breast disease, both before and after the study. No other treatment regimens are allowed to avoid contamination of outcome data.

Since FMTVDM; FMTVDM-B.E.S.T. Imaging is the only patented AI truly quantitative study, which measures changes in regional blood flow and metabolism, which by definition defines coronary artery disease and breast cancer, not only does FMTVDM provide the needed quantification to measure outcomes, but the results cannot be changed or modified through investigator intervention or manipulation. As a patented study, it has been approved and has been recognized most recently by the American Society of Nuclear Cardiologists at the 2018 Conference (Figure 8) and in multiple other peer-reviewed medical journals and has been reproduced in multiple centers in the U.S. and Asia [15-18]. The presentation for the 2018 ASNC is presented below.

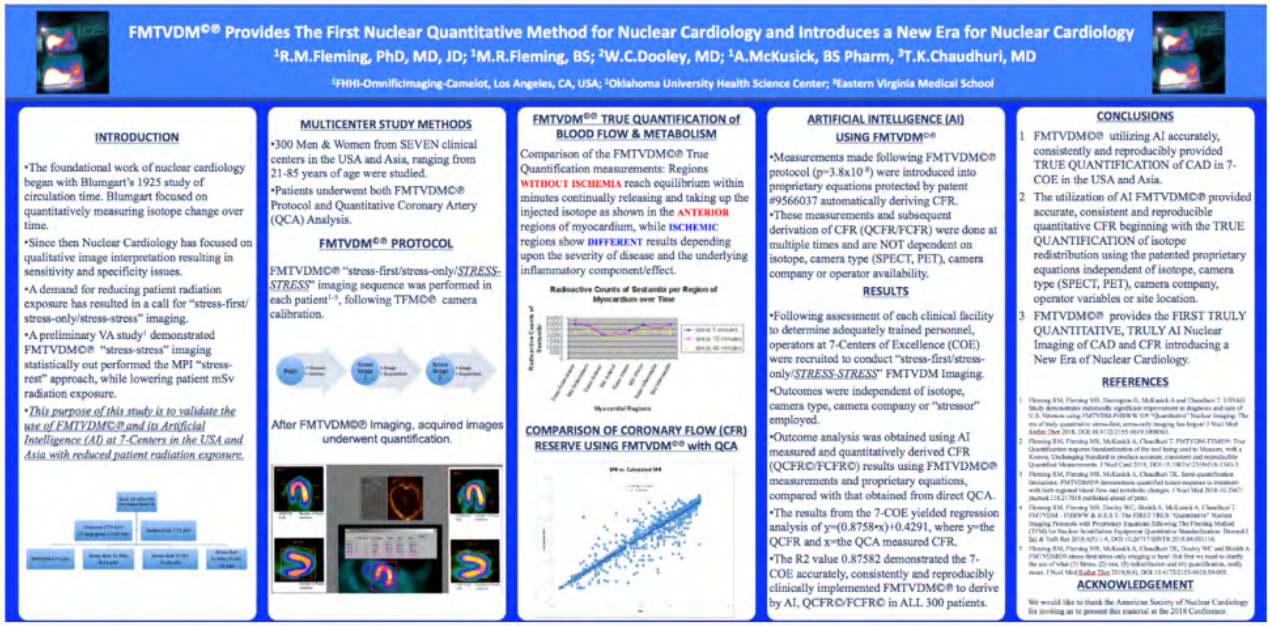

Figure 8: Absolute quantification of coronary artery disease using FMTVDM.

All licensing fees for such a proposed study will be waived by the primary author.

The "Diet Wars Challenge" study should be initiated following an Initial media release specifying that the study is being done and stipulating which diets are being included in the study and which diets are either not included or have elected not to participate. The inference is obvious. If you believe your dietary regimen is the answer to the question, then you would certainly want to participate. You would be less interested in participating if you are not so confident.

Such a public press conference and/or media release of information will make it crystal clear, not only which groups are participating but a similar press conference and/or media release will occur following completion of the study to discuss the results. My participation in the study will only be the quantification of Heart Disease and Breast Cancer Imaging using FMTVDM; FMTVDM-B.E.S.T. Imaging. We will NOT be conducting a dietary arm of the study, nor will we endorse one of the dietary arms of the study. What we have supported for dietary changes up to this point primarily include caloric control as well as limiting both saturated fats and refined carbohydrates as we consider these to be pro-

inflammatory dietary influences. My only focus in this study will be to provide the only truly quantitative outcome measurements available for measuring coronary artery disease and breast disease through the measurement of regional blood flow differences and metabolism [12].

All data results will be redacted of personal identifying information and will be made publically available. All dietary groups must agree to this at the outset to be considered for inclusion into the study. There will be no exceptions and no deletion of results. In the end, this will be the first dietary study providing real quantitative information about coronary artery disease and breast cancer leaving no room for doubt about dietary intervention, data validity or final outcomes.

The results will first be released through the same media source, originally used to make the public aware of the study, with others being able to provide results in tandem.

What do we believe?

We include this at the end of The Fleming Diet Challenge to address what is undoubtedly a point of interest by many; what is the motivation?

During the past few decades, we have had the opportunity to publish papers, give presentations, listen to others, and like so many of you, consider the questions being pondered about *inter alia* diets, heart disease and cancer.

We have looked at a variety of diets over decades; the claims that have been made, the outcomes reported; just as the primary author did during my reflection and development of the "Inflammation and Heart Disease" and "Angina" Theories. To find the truth frequently means looking outside one's comfort or current knowledge base. This is true for everyone involved in investigating heart disease and cancer and working towards advancing the understanding and treatment of these diseases.

Here is what we believe! We believe that many people have some epidemiologic information or case studies, which have caused them to believe in a certain approach to eating. We also believe that others simply have a preference for certain foods and are looking to support their preferences as the right foods to eat.

We believe that a number of people probably began with the right intentions and motivation for answering the question of which foods are good for you, which are bad for you and which have no substantial impact at all.

We also believe the food industry is motivated by profit and will do whatever it needs to do to be profitable. These corporations have already demonstrated that, by increasing the numbers of highly refined and trans saturated fat foods on the market shelves. Intriguingly enough they have extended the shelf life of foods while quite probably reducing the "shelf" life of people. Independent of what the current dietary trend is, the food industry will switch to the production of those foods necessary for the food industry to continue to make a profit.

To be crystal clear, the food industry in this instance does NOT include the farmers and cattlemen growing the food and much of what is currently consumed, can only loosely be called "food" at least to someone raised in Iowa, who came from farm families.

We also believe the U.S. Government is more focused on dealing with surpluses it has and is interested in distributing these surpluses as a means of justifying policy decisions that have been made, than it is on the overall health of society. If we have learned anything, it may be that there is more money in disease than health; at least up to the present models.

We additionally believe that many of the people focused on promoting a certain type of diet have lost the perspective they once had. Motivational factors of proving oneself right or continuing to receive the financial benefit of diets being promoted, have tainted objectivity and obscured the final benefit awaiting people once objective measurements of outcomes of these diets have been made; measurements which we are calling for in this "Diet Wars Challenge".

What do we believe? We believe we indisputably need to get back to science and objectively measure the effect these diets have on Heart Disease and Breast Cancer and we stand ready to find that answer with your help. That's what we believe!.

FMTVDM patent was issued to Dr. Fleming. All figures reproduced by permission.

Bibliography

1. Lloyd-Jones DM., *et al.* "Use of Risk Assessment Tools to Guide Decision-Making in the Primary Prevention of Atherosclerotic Cardiovascular Disease". *Journal of the American College of Cardiology* 1097.18 (2018): 39036.

2. Fleming RM. "Chapter 64. The Pathogenesis of Vascular Disease". Textbook of Angiology. John C. Chang Editor, Springer-Verlag New York. (1999): 787-798.

3. Inflammation and Heart Disease; Fleming Unified Theory of Vascular Disease.1-655833842. TX 7-451-244.

4. Nielson C and Fleming RM. "Blood glucose and cerebrovascular disease in non-diabetic patients". *Angiology* 58.5 (2007): 625-629.

5. Fleming RM. "Chapter 30. Cholesterol, Triglycerides and the treatment of hyperlipidemias". Textbook of Angiology. John C. Chang Editor, Springer-Verlag, New York. (1999): 388-396.

6. Fleming RM., *et al*. "Angina is Caused by Regional Blood Flow Differences - Proof of a Physiologic (Not Anatomic) Narrowing, Joint Session of the European Society of Cardiology and the American College of Cardiology, Annual American College of Cardiology Scientific Sessions, Anaheim, California, USA, 12 March 2000, 49th (Placed on internet www.prous.com for physician training and CME credit, April 2000.)

7. Fleming RM. "Regional Blood Flow Differences Induced by High Dose Dipyridamole Explain Etiology of Angina. 3rd International College of Coronary Artery Disease from Prevention to Intervention. Lyon, France, (2000).

8. Fleming RM. "Coronary Artery Disease is More than Just Coronary Lumen Disease". *American Journal of Cardiology* 88.5 (2001): 599-600.

9. Fleming RM., et al. "Myocardial Perfusion Imaging using High-Dose Dipyridamole Defines Angina. The Difference Between Coronary Artery Disease (CAD) and Coronary Lumen Disease (CLD). 48th Annual Scientific Session of the Society of Nuclear Medicine. Toronto, Ontario, Canada. 28 June 2001.

10. Fleming RM. "Angina and coronary Ischemia are the result of coronary regional Blood Flow Differences". *American College of Angiology* 1 (2003): 127-142.

11. Fleming RM and Harrington GM. "What is the Relationship between Myocardial Perfusion Imaging and Coronary Artery Disease Risk Factors and Markers of Inflammation?". *Angiology* 59.1 (2008): 16-25.

12. The Fleming Method for Tissue and Vascular Differentiation and Metabolism (FMTVDM) using same state single or sequential quantification comparisons. Patent Number 9566037. Issued 02/14/2017 AND Quantified differentiation and identification of changes in tissue by enhancing differences in blood flow and metabolic activity. Pursuant to documentation by Patent Examiner Jennifer A. Lamberski, all claims made under this patent are identical and thereby granted under Patent Number 9566037.

13. Fleming RM., *et al*. "Weight Loss V. Heart Disease: Weight loss is determined by caloric intake. Heart disease is determined by dietary inflammatory components. Tue Quantification of Coronary Artery Disease Measured by AI Using FMTVDM©℗". *Archives of Medicine* 10.5 (2018): 7.

14. Fleming RM., *et al.* "Long-term health effects of the three major diets under self-management with advice, yields high adherence and equal weight loss, but very different long-term cardiovascular health effects as measured by myocardial perfusion imaging and specific markers of inflammatory coronary artery disease". *Biomedical Journal of Scientific & Technical Research* 10.5 (2018): 1-12.

15. Fleming RM., *et al.* "FMTVDM©℗ Provides the First Nuclear Quantitative Method for Nuclear Cardiology and Introduces a New Era for Nuclear Cardiology". *Journal of Nuclear Cardiology* 25.4 (2018): 1453.

16. Fleming RM., *et al.* "Virtual quantification is not True quantification. FMTVDM-TFM©℗ Provides True quantification for SPECT and PET". *Archives of Medicine* 10.5 (2018): 7.

17. Fleming RM., *et al.* "USVAH Study demonstrates statistically significant improvement in diagnosis and care of U.S. Veterans using FMTVDM-FHRWW ©℗ "Quantitative" Nuclear Imaging. The era of truly quantitative stress-first, stress-only imaging has begun!" Journal of Nuclear Medicine and Radiation Therapy (2018).

18. Fleming RM., *et al.* "Multi Center Clinical Trial Confirms FMTVDM©℗ MPI in Seven Modern Clinical Laboratories in the U.S.A. and Asia. Artificial Intelligence (AI) with True Quantification". *Journal of Nuclear Medicine and Radiation Therapy* 9 (2018): 4.

Volume 3 Issue 6 June 2019