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Nutrition

Saturday May 4, 20

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The Lecture at Stanford Medical School

On May 4, 2002, I was privileged to give the following lecture at a symposium on nutrition at Stanford Medical School in Palo Alto, California.



For more than a century, this medical institution has gracefully served the interests of the pharmaceutical cartel by promoting its multi-billion dollar business with heart disease.

For more than a decade, the pharmaceutical cartel has vigorously fought my discovery of the scurvy-heart disease connection, realizing that it threatens the very basis of this business. In that fight, they have also abused many medical opinion leaders.

Now, the growing acceptance of the scurvy-heart disease connection can no longer be ignored. My lecture at Stanford University was a historic event because it broke the stranglehold of the pharmaceutical cartel on established medical institutions. The doctors who organized the event deserve some credit for opening these closely guarded gates of medicine.

Twenty minutes of my lecture felt like an earthquake to the house of cards that is pharmaceutical cardiology. Cellular Medicine has now opened the doors for new generations of doctors and cardiologists, enabling them to save millions of lives.



Delivering my lecture at Stanford University

The Scurvy-Heart Disease Connection: Solution to the Puzzle of Cardiovascular Disease

"I would like to congratulate Stanford University for addressing the need for preventive and natural answers to the number one cause of death in the industrialized world. I will present to you the facts that atherosclerosis, heart attacks and strokes are not diseases, but the direct result of long-term vitamin deficiency. And, therefore, they can be prevented by natural means, without pharmaceutical drugs or surgical intervention.

Current Hypotheses for Atherosclerosis Can Explain Peripheral Vascular Disease But Not Coronary Artery Disease

Researchers:

Goldstein & Brown
Steinberg
Ross
Libby

Hypothesis:

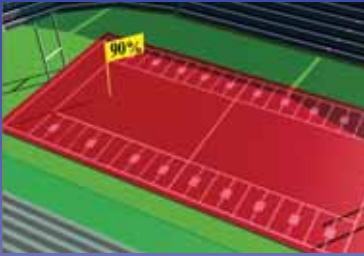
Hypercholesterolemia
Oxidized LDL
Response to Injury
Inflammation

Heart disease is an early form of the sailor's disease scurvy. In my presentation, I can only focus on the most compelling evidence. For more details, I encourage you to visit our research website www.dr-rath-research.org.

All existing hypotheses of atherogenesis have one problem in common — they defy human logic. If high cholesterol levels, oxidized LDL or bacteria damage the vascular wall, atherosclerotic plaques would occur along the entire vascular pipeline. Inevitably, peripheral vascular disease would be the primary manifestation of cardiovascular disease. This is clearly not the case.

It doesn't require a degree from Stanford or any other medical school — any layperson can solve the 'Football Field Riddle.'

The “Football Field Riddle”



The total surface area of the blood vessel system in a person is comparable to the size of a football field.





But in 90% of the cases, it clogs in the same small spot — the size of the marker for the “extra point” kick.

The arteries, veins and capillaries in our bodies compose a pipeline that is 60,000 miles long and covers the area of a football field. But this pipeline fails in 90% of the cases at one specific spot: the coronary arteries, which are the length of only one billionth of the total vascular pipeline. If high cholesterol — or any other risk factor circulating in the bloodstream — could cause damage to this pipeline, it would clog everywhere, not just at one spot. Obviously, elevated cholesterol cannot be the primary cause of coronary artery disease.

The solution to the puzzle of cardiovascular disease, therefore, must lie in the explanation of coronary artery plaques as the predominant manifestation of cardiovascular disease. To solve this puzzle, we need to refocus our attention away from the bloodstream and its constituents to the one and only relevant target: the stability of the vascular wall.

The following picture shows the connection between cardiovascular disease and the sailor's disease scurvy. Unlike animals, the human body cannot synthesize vitamin C. Ascorbate deficiency results in two distinct morphological changes in the vascular wall: impaired vascular stability due to decreased collagen synthesis and loss of the endothelial barrier function.

The “Scurvy-Heart Disease Connection”

Scurvy	Heart Disease
	
	

Cardiovascular disease is an early form of the sailor’s disease scurvy. In both cases, lack of vitamin C in the vascular cells is the underlying problem.

In scurvy, a complete depletion of ascorbate in the body dissolves the structure of the blood vessel wall causing leaks, blood loss, and eventually death.

In cardiovascular disease, ascorbate deficiency gradually develops over decades, allowing time for vascular repair mechanisms (plaque formation).

The sailors of earlier centuries died within a few months from hemorrhagic blood loss due to a lack of endogenous ascorbate synthesis combined with a vitamin-deficient diet. When the Indians gave those sailors tea from tree barks and other vitamin-rich nutrition, blood loss was stopped and the vascular wall healed naturally. Thus, the damage was repaired!

Today, we all get *some* vitamin C in the diet, and open scurvy is rare. But it is not enough, and almost everyone suffers from chronic vitamin deficiency. Over decades, microscopic lesions develop along the vascular wall, especially in areas of high mechanical stress, such as the coronary arteries (pumping heart).

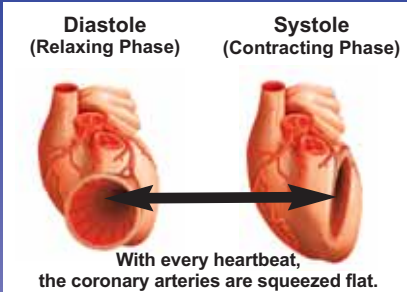
Just as in the sailor’s disease scurvy, vitamin C induces the natural repair of the blood vessel wall in cardiovascular disease, leading to a halt in the progression and even to the natural regression of vascular lesions.

In contrast to current models of atherogenesis, the ‘Scurvy-Heart Disease Connection’ answers all the key questions in cardiology today.

1. Why do we get infarctions of the heart and not of the nose or ears?

The answer can be reduced to two factors: structural impairment of the vascular wall due to vitamin deficiency combined

Why People Get Heart Attacks, But Not “Nose Attacks”



The underlying weakness of the blood vessel wall due to vitamin deficiency is primarily exposed at sites of extreme mechanical stress.

Due to the continuous heart pumping, the coronary arteries are the most stressed areas and the primary sites of vascular damage and repair (plaque formation).

with the mechanical stress from pulsatile blood flow in the coronary arteries. It is at this unique spot where the underlying structural impairment is exposed first.

2. Why do we get arteriosclerosis, but not venosclerosis?

The hypothesis that cholesterol, bacterial infections, chlamydia and other blood risk factors cause plaques would inevitably also lead to clogging of veins and lead to *venosclerosis*. This is clearly not the case. The scurvy-heart disease connection provides the only logical answer to this question.

Why People Get Arteriosclerosis, But Not Venosclerosis



Arteriosclerosis is the cause of every second death.

Venosclerosis is unknown unless a vein is implanted as an artery — such as in coronary bypass surgery. Then, veins, too, develop plaques.

This is logical proof that not cholesterol, but vascular wall weakness exposed by mechanical stress causes infarctions.

Why Animals Don't Get Heart Attacks



With the rarest of exceptions, animals don't develop arteriosclerosis.

Prominent examples are bears. They have average blood cholesterol levels of about 600 mg/dl. They don't get heart attacks because they produce their own vitamin C, which stabilizes their artery walls.

3. Why don't animals get heart attacks, but people do?

Why are bears and other hibernators with cholesterol levels of 600 mg/dl not extinct from an epidemic of heart attacks? The answer: Animals produce their own vitamin C in amounts between one gram and 20 grams (six teaspoons) each day, compared to the human body weight. These amounts of ascorbate are obviously sufficient to optimize the stability of their vascular walls — without any necessity for statins and other cholesterol lowering drugs.

4. Why are all important risk factors for cardiovascular disease closely connected to ascorbate deficiency?

All risk factors for cardiovascular disease known today, including:

- carbohydrate metabolism — such as diabetes
- lipid metabolism — high cholesterol and other hyperlipidemias
- amino acid metabolism — such as homocysteinuria

are closely connected to deficiencies in vitamin C and other micronutrients essential for vascular cell metabolism. The common denominator of these metabolic disorders is to provide compensatory stability for the vitamin-deficient vascular wall. This is also the reason why ascorbate deficiency increases fibrinogen and thromboxane levels while decreasing endothelial-derived relaxing factors (NO) and prostacyclin.

The “Guinea Pig Proof”

Like humans, guinea pigs cannot produce their own vitamin C.



With low vitamin C in their diets, these animals develop atherosclerotic plaques structurally identical to human atherosclerosis.

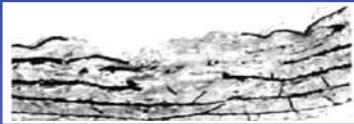


When fed a daily amount of vitamin C equivalent to 5 grams, the arteries were protected and did not show any plaques.

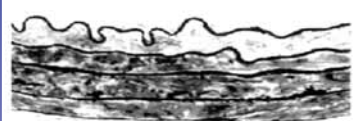
Let's consider the key evidence for the scurvy-heart disease connection. The guinea pig, like man, cannot synthesize ascorbate endogenously. In our research published in the *Proceedings of the National Academy of Sciences*, we demonstrated that when guinea pigs were fed vitamin C only at the level of the human RDA, they developed atherosclerosis. These vascular lesions were histologically indistinguishable from human atherosclerotic plaques. In contrast, animals that received about one teaspoon of vitamin C per day had clean arteries.

These experiments were confirmed by Dr. Maeda and her colleagues in an ascorbate ‘knock-out’ animal model. The first manifestation in these animals was the deterioration of the vascular wall, which resembled early atherosclerosis in humans.

Confirmation for Dr. Rath's Scurvy-Heart Disease Connection



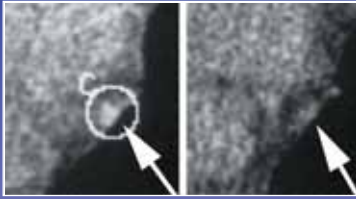
When vitamin C production in mice was genetically “terminated” and they did not receive vitamin C in their diets, these animals developed structural lesions in their artery walls identical to early human atherosclerosis.



Normal mice, able to produce their own vitamin C, have healthy vascular walls and cardiovascular disease does not develop.

Maeda et. al. PNAS (2000) 97: 841-846.

Clinical Proof From Coronary Heart Disease Patients



Before

After

For the first time in medicine, the natural reversal of coronary heart disease was documented by X-ray pictures (Ultrafast Computed Tomography).

In this patient, the coronary artery plaques had entirely disappeared after one year of following my cellular nutrient program.

We confirmed these results in a clinical study in patients with existing coronary artery deposits measured by Ultrafast Computed Tomography. Following a defined vitamin program, the progression of calcification significantly decreased and, in some cases, the disappearance of lesions was documented, as you can see in the X-ray CT pictures. (The publication of this clinical study is documented at the end of this book.)

The scurvy-heart disease connection means a paradigm shift in medicine from targeting symptoms to the only relevant preventive and therapeutic target: the stability of the vascular wall. With the discovery of the scurvy-heart disease connection, the 'universe of heart disease' has ceased to be a 'plate' and has become a 'globe.'

The Scurvy-Heart Disease Connection Turns the "Universe of Heart Disease" From a Plate Into a Globe



Now that we have identified the true nature of cardiovascular disease, its eradication is only a question of time. Ten years from now, the headlines of leading newspapers may read:

- "WHO proclaims heart disease as eradicated."
- "The pharmaceutical market of statins and other symptom-oriented drugs have collapsed on Wall Street."
- "The cardiology departments at Stanford and other medical schools are closing."

On behalf of millions of patients with heart disease, I call upon Stanford University and other medical institutions to accept their responsibility and join us in the eradication of cardiovascular disease." (*End of lecture*)

Reactions to My Lecture

Question by John Cook, Ph.D., M.D., Professor of Cardiology and organizer of this conference at Stanford Medical School: Dr. Rath, you mentioned something that is very interesting. In fact, I think it is the \$64,000 question: Why does one develop atherosclerosis? Why is there a special heterogeneity (variation) in atherosclerosis? I think that's an important point. I feel it is because of differences in the systems, in that the veins and arteries are quite different. Certainly, they are subjected to different hemodynamic (blood flow) forces, and actually they are derived from different tissues, the veins, capillaries and so forth, and my own feeling is that would explain the special heterogeneity, as well as the hemodynamic forces.

Dr. Rath: Well, if you take a coronary bypass operation, for example, a *vein* is taken from the leg and that blood vessel is implanted as a coronary *artery* on top of the heart. From that moment on, this vein is subjected to pulsatile (pumping) blood flow. The former vein is now functioning as an artery, and it develops atherosclerotic plaques that eventually can clog this blood vessel.

Comment by another professor of cardiology: But we also have studies that show little or no effect of vitamins on cardiovascular disease.

Dr. Rath: Who is “we”? If you go to the medical libraries on the Internet, you will find over 10,000 studies documenting the health benefits of vitamins. Moreover, the greatest study ever conducted on Planet Earth has revealed that in billions of animals, cardiovascular disease is essentially unknown because they produce their own vitamin C.

The question is how long are you willing to ignore the facts and risk that millions of people will continue to die from a disease that could be long gone? So, who is “we”?

“My dear Kepler, what do you say of the leading philosophers here to whom I have offered a thousand times of my own accord to show my studies, but who, with the lazy obstinacy of a serpent who has eaten his fill, have never consented to look at the planets, or moon, or telescope? Verily, just as serpents close their eyes, so do men close their eyes to the light of truth.”

Galileo Galilei in a letter to Johannes Kepler, 1630

Eradicating Heart Disease Is Possible!

Rath-Pauling Call to Eradicate Heart Disease

On July 2, 1992, for the first time ever, the possibility of eradicating heart disease from mankind was publicly announced. In his last public appeal, the two-time Nobel Laureate Linus Pauling supported my scientific breakthrough in heart disease research.

Only weeks later, the pharmaceutical cartel launched its legislative efforts via the FDA (Food and Drug Administration) to suppress this breakthrough and to make vitamins prescription drugs. In the “battle for vitamin freedom” of 1992-1994, the people in the U.S. prevented these unscrupulous plans and defended their health rights.

A Call for an International Effort to Abolish Heart Disease

Heart disease, strokes, and other forms of cardiovascular disease now kill millions of people every year and cause millions more to be disabled. There now exists the opportunity to reduce greatly this toll of death and disability by the optimum dietary supplementation with vitamins and other essential nutrients.

THE GOAL OF ELIMINATING HEART DISEASE AS THE MAJOR CAUSE OF DEATH AND DISABILITY IS NOW IN SIGHT!

Matthew Rath and Linus Pauling



Above: Two handwritten pages from the last public appeal of the two-time Nobel Laureate before his death in 1994.

Left: Dr. Pauling and myself at the historic press conference in San Francisco, July 2, 1992, announcing “A Call for an International Effort to Abolish Heart Disease.”

CALL FOR AN INTERNATIONAL EFFORT TO ABOLISH HEART DISEASE

Heart disease, stroke and other forms of cardiovascular disease now kill millions of people every year and cause millions more to be disabled. There now exists the opportunity to reduce greatly this toll of death and disability by the optimum dietary supplementation with vitamins and other essential nutrients.

During recent years, we and our associates have made two remarkable discoveries. One is that the primary cause of heart disease is the insufficient intake of ascorbate (vitamin C), an insufficiency from which nearly every person on earth suffers. Ascorbate deficiency leads to weakness of the walls of the arteries and the initiation of the atherosclerotic process, particularly in stressed regions. We conclude that cholesterol and other blood risk factors increase the risk for heart disease only if the wall of the artery is weakened by ascorbate deficiency.

The other discovery is that the main cholesterol-transporting particle forming atherosclerotic plaques is not LDL (low-density lipoprotein) but a related lipoprotein, lipoprotein (a). Moreover, certain essential nutrients, especially the amino acid L-lysine, can block the deposition of this lipoprotein and may even reduce existing plaques. We have concluded that the optimum supplementation of ascorbate and some other nutrients could largely prevent heart disease and stroke and be effective in treating existing disease. Published clinical and epidemiological data support this conclusion.

The goal is now in sight: the abolition of heart disease as the cause of disability and mortality for the present generation and future generations of human beings.

WITH MILLIONS OF LIVES EACH YEAR AT STAKE, NO TIME SHOULD BE LOST!

- We call upon our colleagues in science and medicine to join in a vigorous international effort, on the levels of both basic research and clinical studies, to investigate the value of vitamin C and other nutrients in controlling heart disease.
- We call upon national and international health authorities and other health institutions to support this effort with political and financial measures.
- We call upon every human being to encourage local medical institutions and physicians to take an active part in this process.

THE GOAL OF ELIMINATING HEART DISEASE AS THE MAJOR CAUSE OF DEATH AND DISABILITY IS NOW IN SIGHT!

Matthias Rath and Linus Pauling
San Francisco, California, July 1992

“Health for All by the Year 2020” Is Possible!

Dr. Rath's Call to Political Leaders, World Summit 2002

After 10 years of a series of Cellular Medicine breakthroughs, it is clear that Cellular Medicine can help control today's most common diseases. At the World Summit in Johannesburg in August 2002, I called upon the world community to take advantage of these breakthroughs.

Health For All

The Dr. Rath Health Foundation is dedicated to promoting natural health information and to protecting the right to natural health against the global interests of the pharmaceutical industry.



The late two-time Nobel Laureate Dr. Linus Pauling, who considered Dr. Rath as his successor stated: "Dr. Rath's discoveries rank among the most important discoveries in medicine."

Dr. Matthias Rath, M.D., is the world renowned scientist and physician who led the scientific breakthrough towards natural prevention and treatment of cardiovascular disease and more recently cancer. His discoveries have already saved many lives around the world.

Dr. Rath leads an internationally recognized independent research institute

dedicated to eliminate today's most common diseases with effective, natural and affordable therapies.

Dr. Rath is member of the American Heart Association (AHA), the New York Academy of Sciences and other international organizations.

In 2001 he has been awarded the "Bulwark of Liberty Award" from the American Association of Preventive Medicine for his courage to stand up against the plans of the pharmaceutical industry to ban natural health information world-wide by abusing the United Nation's "Codex Alimentarius Commission".

1. **Health is a basic human right.** Every person is entitled to make use of this right without any restriction. Public institutions and private organizations are to be held accountable for providing life-saving health information to the people of the world. The obstruction of the right to essential health information for everyone constitutes a crime against humanity.
2. **Today, health is not available to every human being for good reasons.** They include social injustice, military conflicts and others. Another significant reason is the fact that the most profitable industry on earth, the pharmaceutical industry, is an investment industry based upon the existence and continuation of diseases - despite declarations to the contrary. Low-cost prevention, treatment and elimination of diseases threaten this multi-trillion dollar "business with disease".
3. **Most efforts to improve health on a global scale have failed thus far.** The World Health Organization's effort "Health for All by the Year 2000" could not reach its goals because it did not distinctly separate itself from the global "business with disease." It focused instead on administrative health care changes, rather than taking advantage of global advances in medicine.
4. **Advances in the field of natural medicine have been made over recent years** that will reduce the incidence of common diseases in the industrialized countries as well as in the developing world, to a fraction of their current frequency. The primary cause of the world's most common health conditions is a chronic deficiency of micronutrients, essential for optimum cellular energy metabolism as well as optimum connective tissue stability.
5. **In the industrialized world,** the leading causes of death are heart attacks, cancer, strokes, diabetes and high blood pressure. Using the available knowledge in nutritional

For more information, visit:

These breakthroughs can also be applied to fight major health problems in the developing world, including AIDS and other infectious diseases. The Dr. Rath Health Foundation promotes effective and affordable natural health information with the goal of building a new global health care system to provide "health for all by the year 2020."

By The Year 2020

research and cellular medicine, these health conditions can be significantly reduced and hundreds of millions of lives can be saved.

6. **In the developing world**, two billion people suffer from deficiencies in micronutrients, according to United Nations Organizations. Avitaminosis is a leading cause of disease resulting in blindness in millions and promoting infectious diseases in hundreds of millions by compromising cellular defense mechanisms in their bodies. Taking advantage of the knowledge in nutritional medicine already available today, billions of lives can be saved in the developing world.
7. **The eradication of today's most common health problems is dependent on one factor only: how fast the information about this breakthrough in natural health can be spread.** While the scientific knowledge to combat these diseases effectively is available and the essential nutrients to prevent these health conditions, can be produced at low costs, in any quantity, anywhere in the world, the dissemination of this life-saving information to the people of the world is being obstructed.
8. **The Pharmaceutical industry tries to protect its global drug market by outlawing natural remedies.** Effective, non-patentable and affordable natural health approaches threaten the very existence of the pharmaceutical industry. The multi-trillion dollar global pharmaceutical market is dependent on synthetic drugs that allow an excessively high return on investment based on the patentability of those drugs. To secure the continued existence of the pharmaceutical industry as the most profitable industry on earth, large corporations embarked on a global battle to outlaw the dissemination of natural health information. To that effect the pharmaceutical industry abuses the United Nations "Codex Alimentarius Commission" and other national and international bodies.

9. **The people of the world face one of the largest challenges in human history.** The right to health and life for billions of people is being threatened by the profits interests of a few shareholders. The goals of these two interest groups are incompatible by their very nature. Similarly, in the battle to save human lives against the profits from patented drugs, every government, every public and private institution has to take a decision on which side they stand. And they will be held accountable by history.
10. **The goal "Health for All by the Year 2020" is in sight.** What is needed immediately is a worldwide effort to promote the dissemination of natural health benefits in every country.

I call upon

- **The United Nations Organizations** and other international organizations to promote natural health policies by all means available;
- **Politicians** in every country to implement natural health as an integral part of national health policies;
- **Health professionals** to utilize natural health approaches to improve the health of your patients.

I call upon every man and woman to spread this life-saving information in order to protect your life and that of millions of others.

Johannesburg,
August 2002
Matthias Rath, M.D.



Health and Peace — Not Disease and War!

Text from my worldwide Open Letter Series in February/March 2003: Ten years ago, the late Linus Pauling said to me: “Your discoveries are so important for millions of people that they threaten entire industries. One day there may even be wars just to prevent this breakthrough from being widely accepted. This is the time when you need to stand up!” That time is now!

Text from my Open Letter published first on February 28, 2003 in the New York Times:

Today, millions of people worldwide are waking up to the fact that the pharmaceutical industry is an investment industry based on the continuation of diseases. The survival of the pharmaceutical investment industry is threatened by four main factors:

1 **Unsolvable business conflicts.** The nature of the pharmaceutical investment industry is the “business with disease.” Its basis is the patentability of new synthetic drugs that merely target symptoms, but do not eliminate the root cause of diseases. The continued existence of diseases and their expansion is a precondition for further growth of this industry. Prevention and eradication of diseases undermine the economic basis of this business.

2 **Unsolvable legal conflicts.** A wave of patient litigation against the deadly side effects of pharmaceutical drugs threatens to cripple this industry. An end to this litigation is not in sight, since drug side effects are the fourth leading cause of death in the industrialized world. Side effects of pharmaceutical drugs kill more Americans every year than WWII and the Vietnam War combined.

3 **Unsolvable ethical conflicts.** The pharmaceutical industry faces an intrinsic conflict between maintaining profits from patent fees and meeting the health needs of people. In developing countries, the profitability of drugs has been a major factor contributing to the spread of AIDS and other epidemics.

4 **Unsolvable scientific conflicts.** Advances in vitamin research, Cellular Medicine and natural health allow the control of today’s most common diseases. These safe, effective and affordable natural therapies focus on the prevention and eradication of diseases, not only the alleviation of symptoms. This fact and the low profitability of these non-patentable natural approaches threaten the economic base of the pharmaceutical investment business.

The war against Iraq is not primarily about fighting “terrorism” or conquering oil fields. It is part of a long-term strategy of the pharmaceutical/petrochemical investment groups to create the psychological state of fear to maintain global control.

The New York Times

Mr. Bush - This War Is Not a Sign of Strength, But of Desperation!

Open Letter to President Bush, M.D., on U.S. President George Bush and on the People of the World!





Mr. Bush, in the name of the
 Human Race
 More Information: www.dr-rath.org
 Phone: (800)

Algemeen Dagblad

The Star

CORRIERE DELLA SERA

EL PAIS

We Are No Longer Willing To Sacrifice Health and Peace!

Open Letter to President Bush, M.D. on the American People and on the People of the World!





Dr. Rath's Health Foundation
 Health and the Lives of "us"
www.dr-rath-health-foundation.org

Le Monde

الانوار

Hürriyet

INTERNATIONAL
 Herald Tribune

PHARMA-CARTEL WAR PLANS CAN NO LONGER BE ACHIEVED!




More Information: www.dr-rath-health-foundation.org

Neue Zürcher Zeitung
 NEUCHÂTEL - GENEVE - BERNE

The Straits Times

Daily Telegraph

Blueprint for a Healthy World

On Sunday, March 23, 2003, on the eve of the 2003 Academy Awards (“the Oscars”) ceremony in Los Angeles, I published another “Call to Action” in the *Los Angeles Times*, the largest newspaper in that city. The people of Los Angeles and celebrities from around the world took this message home.

This public information exposed to a global audience that the precondition for the eradication of today’s most common health problems is the termination of the investment “business with disease” organized around the Rockefeller investment group. For almost a century, these special interest groups have strategically built the most profitable investment industry on earth — at the expense of the health and lives of millions. To achieve their goals, they have abused all sectors of society, including medicine, the media, governments and even the largest political bodies on earth, such as the World Health Organization (WHO).

Los Angeles Times

March 23, 2003

The war against Iraq has just started and there is already a winner: the people of the World. Over the past weeks, we have informed the people in America and the rest of the World about the background of this war and its main corporate benefactor - the pharmaceutical industry.

This information was first published in the *New York Times*, in the city where political leaders had congregated at the United Nations over the recent months like rarely before in history. International tension and the escalation to war created a climate where the information about the pharmaceutical industry as the main benefactor of the ‘war against terrorism’ spread like a bush fire.

The global spread of this information was also an important reason why small countries in the Security Council - unexpectedly - resisted the pressure by the

United States and British administrations, denying them any mandate and any support by international law for their war.

Now, the war led by the Bush and Blair administrations can no longer reach its primary political and economic goal - that is to impose the monopoly of the multi-trillion dollar pharmaceutical investment “business with disease” on the people of this planet for generations to come.

As the scientist whose discoveries enable us to control today’s most common diseases by natural means and having unmasked the corporate benefactors behind the current war, I consider it my responsibility to issue a call to the people and the political leaders of the World to immediately start building a ‘World without Disease’!

Los Angeles Times, March 23, 2003

Health for All by the Year 2020

Mankind now has an unique opportunity to liberate itself from today's most common diseases.

A BREATH-TAKING PERSPECTIVE

• **Cardiovascular disease** has been identified as the result of a structural impairment of the blood vessel wall similar to the tailor's disease scrovy. Optimum supply of vitamin C and other micronutrients that stimulate the production of collagen - the vascular reinforcement molecules - is an effective, safe and affordable way to prevent heart attacks and strokes. Thus, the number one cause of death in the industrialized world today can largely be eradicated in this and future generations.

Global implementation of this scientific knowledge will save millions of lives, billions in health care dollars and eliminate the trillion-dollar pharmaceutical business with cardiovascular disease.

• **High blood pressure, heart failure, irregular heart beat, and diabetic circulatory problems** are primarily the result of long-term micronutrient deficiencies impairing the function of millions of cells that compose the heart muscle and the blood vessel walls.

Global implementation of this scientific breakthrough will save millions of lives, billions in health care dollars and eliminate the trillion dollar pharmaceutical business with these diseases.

• **Cancer**, the second most frequent cause of death in the industrialized world is no longer a death verdict. All cancer cells spread by using the same mechanism. They produce massive amounts of collagen-degrading enzymes capable of paving their way through the human body during cancer spread.

Effective, safe and affordable micronutrients such as the amino acid lysine, vitamin C and other specific nutrients block these enzymes and thereby impede cancer disease without any side effects.

Global implementation of this scientific breakthrough will save millions of lives, billions in health care dollars and eliminate the trillion dollar pharmaceutical business with cancer.

• **Infectious diseases, AIDS and other epidemics** are the leading cause of death in the developing world. B-vitamins and other essential nutrients regulate the production of white blood cells and optimize immune system function in the fight against tuberculosis and other epidemics. Moreover, vitamin C alone has been shown to reduce the multiplication of the AIDS virus to less than 1% of its normal rate. This simple vitamin is more effective than any combination of expensive pharmaceutical drugs.

Global implementation of this scientific breakthrough will save millions of lives, billions in health care dollars and eliminate the trillion dollar pharmaceutical business with AIDS and other infectious diseases.

In summary, today's most common diseases can now be largely eradicated by natural therapies, thereby improving human health globally and terminating the pharmaceutical investment business with disease.

WHY THIS DID NOT HAPPEN EARLIER

At the beginning of the 21st century mankind wakes up to a nightmare. A hundred years ago the Rockefeller Group, already controlling the global oil business at that time, defined another global investment market: the human body and the diseases it hosts.

The return on their investment became dependent on the patentability of drugs and the respective patent royalties. Under the umbrella of "philanthropy" and "benefactors to mankind" the greatest deception in the history of mankind was strategically developed.



Every country that focuses its health care system on effective, natural, non-patentable health approaches is an important step towards a healthier and more peaceful world.

You can follow the liberation of mankind from the yoke of the pharmaceutical "investment business with disease" on the Website of our Foundation.

Millions of patients were promised a "cure" for their health problems, but the vast majority of the "remedies" sold had no proven efficacy, at best they covered symptoms. By triggering an epidemic of new diseases from drug side-effects, these deceptive products constantly expanded the "disease market".

A strategic precondition for this new market was the elimination of "competition" from effective natural therapies. The basic knowledge about the essential nutrients required for optimum cellular metabolism was systematically eliminated from medical schools, the textbooks of medicine and from the minds of generations of doctors.

Over several decades the pharmaceutical business with disease became the largest investment industry on planet earth. The huge profits were used to gain influence in all areas of society, including science, medicine, media and politics. Even the largest international bodies did not resist its influence.

WE NEED A NEW WORLD HEALTH ORGANIZATION

The World Health Organization was founded more than 50 years ago to promote health on a global level. A first focus was to improve health through nutrition, including micronutrients. Within two decades the influence of the pharmaceutical cartel had shifted this focus. By abusing the WHO and other UN organizations (e.g. "Codes Alimentarius") this industry is trying to impose global protection laws to protect and promote the pharmaceutical investment business with patented drugs from being eliminated by mostly superior, but non-patentable natural therapies.

As the direct result of this silent "take over" of control of global health care by the pharmaceutical industry during the past century, hundreds of millions of people have died from diseases that could have vanished long ago - if not for the multi-trillion-dollar pharmaceutical investment "business with disease". Today, more than two billion people suffer from micronutrient deficiencies in the developing world alone. Thus, all of an most now work towards building a new world health organization that liberates us from today's most common diseases.

WE NEED A NEW HEALTHY AND PEACEFUL WORLD

Health is a basic human right. We, the people of the earth will not allow this right to be withheld from us any longer. We will not rest until the right to health - particularly the unrestricted access to natural therapies - has become a human right for all people of the world, guaranteed by national and international constitutions.

I call upon every person on earth: No matter where you live and what you do you should start building this new world right now! Every living room, every doctor's office or hospital, every school, university, community center, every education text book or movie that promotes natural health is a first step towards creating a healthier world. By constructing this new world we not only eliminate entire diseases but also release billions of dollars in funds that are currently wasted for promoting disease and destruction.

I call upon the political leaders to implement natural health as the basis of a prevention-oriented national health care policy. Now that this scientific knowledge is available around the world, you must use it to improve the health of your people. Every country that redirects its health care towards natural health is a quantum leap forward towards a common goal: Health for All by the Year 2020.

There is no time to be lost!

Sincerely,

Manin Rau.

More information: www.dr-rath-foundation.org

Vision for a World of Health, Peace and Social Justice

On June 15, 2003, representatives from five continents met in The Hague, the Netherlands and unanimously voted in support of the "Constitution for a World of Peace, Health and Social Justice." This constitution — proclaimed only weeks after the end of the Iraq War — is the beginning of a global health and education campaign to end the "business with disease" and liberate human health from the imposed burden of cardiovascular disease, cancer and many other diseases.

PEOPLE'S CONSTITUTION FOR A WORLD OF

At the beginning of the third millennium mankind stands at the crossroads. On the one hand are the interests of six billion people currently inhabiting our planet - and of all future generations - who wish to live a dignified and healthy life in a peace-ful world. On the other hand is a small corporate interest group denying the whole of mankind these basic human rights for one reason only - financial greed.

In this situation, we, the people of the world, have the choice: we either continue accepting the yoke of those investment industries forcing wars and diseases upon us or we liberate ourselves from these burdens and start building a world determined by the principles of peace, health and social justice.

We, the people of the world, recognize that never before in the course of history have we been more united to preserve peace, to terminate the investment 'business with disease' and to bring to justice those who sacrifice peace and health for corporate gain.

Therefore, we the people from East and West, North and South, from rich and poor countries have decided to create a world of peace, health and social justice for ourselves and generations to come.

As our fundamental rights we proclaim:

THE RIGHT TO PEACE. We, the people of the world, are determined to defend our right to peace with all means available. In the age of weapons of mass destruction war is no longer an option for solving international conflicts. We will make sure that those who conduct a war without an explicit mandate by international law will be held responsible and will be brought to justice for their crimes. We will not rest until they are punished - irrespective of economic or political consequences - because we recognize that this is the only way to protect our planet from destruction.

THE RIGHT TO LIFE. We, the people of the world, are determined to defend our right to life with all means available. We will not rest until all factors shortening the life span of people on our planet are eliminated. We will fight hunger, malnutrition and other factors already killing millions of inhabitants of our planet each year including infants and children. We will also terminate the 'investment business with disease' as the result of which more people have died prematurely from preventable diseases than in all wars of mankind put together.

Everyone should support this Agenda!



On the same day, I filed a complaint — on behalf of the people of the world — at the United Nation's International Criminal Court in The Hague (ICC) with the goal to forever terminate the promotion of diseases for corporate greed and other crimes against humanity.

AGENDA

PEACE, HEALTH AND SOCIAL JUSTICE

THE RIGHT TO HEALTH. We, the people of the world, are determined to defend our right to health with all means available. We will make sure that the pharmaceutical 'business with disease' the deliberate promotion of diseases for corporate gain, is outlawed worldwide. We will bring to justice those who deliberately promote diseases and those who withhold live-saving information on natural, non-patentable therapies. In providing health to our communities and in implementing national health care programs we will focus on effective and safe, natural health approaches. The primary goal of any health care strategy is prevention and eradication of diseases.

THE RIGHT TO SOCIAL JUSTICE. We, the people of the world, are determined to defend our right to social justice with all means available. We no longer accept that two out of three inhabitants of our planet live in poverty and illiteracy. We will make sure that the resources of the world are redistributed in a way that provides education and a dignified life for every citizen of our planet. To finance this redistribution we will use the financial resources liberated from terminating the multi-trillion dollar 'business with disease' and from decreasing military expenditure.

We recognize that as a first step to reach these goals those corporate interest groups promoting war and disease need to be brought to justice in international courts for sacrificing the lives of millions of people and for committing other crimes against humanity.

Public exposure and punishment of the representatives of these corporate interest groups will remove the last obstacle for the people of the world to terminate the 'Dark Ages of Disease, War and Injustice' and start building a 'New World of Peace, Health and Social Justice'.

On behalf of the people of the world -

The Hague, May 2003

Visit www.dr-rath-health-foundation.org

Growing Awareness

Our global information campaign did not go unnoticed. In fact, governmental and private organizations, corporations, universities and other institutions that contacted us via our website are among the “Who’s Who” of the world. Following is only a partial list:



Government Organizations in:

- Australia
- Belgium
- Brazil
- Canada
- Chile
- Egypt
- Germany
- India
- Italy
- Egypt
- Jordan
- Malaysia
- Netherlands
- Norway
- Poland
- South Africa
- Spain
- Sweden
- Turkey
- USA (Department of Defense)

Other Institutions:

- Academies of Sciences from: Bulgaria, Russia, Sweden
- Development Bank of Singapore
- Dow Jones & Co.
- European Commission
- Ministerio de Salud Chile
- Kaiser Health Insurance (US)
- Karolinska Institute Medical University
- Los Angeles Public Library
- OPEC Fund
- Reuters News Agency
- Royal Communications Jordan
- South African Broadcasting Corp.
- States of California, Florida, Georgia, Illinois, Minnesota, New Jersey and Texas
- UK National Health Service
- UNO, WHO and UNICEF
- U.S. Centers for Disease Control
- USA Today

Worldwide Support

Speaking for millions of supporters around the world:

"I read your public information in Australia – fantastic work! Congratulations on your integrity!"

Australia



"I really congratulate you for your courage."

Argentina



"I support Dr. Rath in his mission to enlighten the world regarding the truth about pharmaceutical companies."

Great Britain



"I appreciate the work that Dr. Rath is doing to inform me and the world. Whatever we can do to help him affect public and government policy is a step in the right direction."

United States



Corporations:

- Abbott Laboratories
- Bayer
- Boeing
- Chase Manhattan
- Deutsche Bank
- Eli Lilly
- Exxon
- Glaxo Smith Kline Beecham
- Halliburton
- Koch Industries
- Merck
- Microsoft
- Pfizer
- Raytheon Company
- Shell
- Siemens
- Swiss Bank Corporation
- Texaco
- Visa
- Xerox

Universities:

- Austria: Vienna, Innsbruck
- Brazil: Buenos Aires
- Canada: McGill
- Cuba: Cienfuegos
- Germany: Heidelberg, Berlin
- France: Grenoble
- India: Madras
- Italy: Bologna, Milan, Rome
- Japan: Nagoya
- Korea: Seoul
- Mexico: National Univ.
- Netherlands: Amsterdam, Rotterdam
- Poland: Warsaw, Krakow
- Singapore: National Univ.
- Spain: Madrid, Seville, Salamanca
- Sweden: School of Economics
- South Africa: Cape Town, Pretoria
- UK: Oxford, Kings, London, Wales
- USA: Stanford, Harvard, Berkeley, Columbia, Rutgers, Mayo, Yale

PETITION FOR VITAMIN FREEDOM

Each year, pharmaceutical companies make several hundred billions of dollars solely from worldwide sales of cardiovascular drugs. The natural control of the cardiovascular disease epidemic will lead to the collapse of this market and threaten the existence of this industry.

In its struggle for survival, the pharmaceutical industry has formed a global “pharma-cartel,” aiming to block the possibility of eradicating heart disease by natural means. By abusing the World Health Organization’s “Codex Alimentarius Commission,” the European Parliament and other national and international political institutions, the “pharma-cartel” pursues a worldwide ban on all information about the preventive and therapeutic health benefits of vitamins, minerals and other natural, non-patentable therapies.

In this situation, millions of people worldwide have to protect their own health and lives against the interests of this pharmaceutical investment “business with disease.”

Free access to vitamins and unrestricted natural health information worldwide will be the first victory on our way toward the eradication of heart disease and other diseases.

We demand that our own government and the governments of all other countries:

- **Abolish all barriers restricting free access to vitamins and other essential nutrients.**
- **Spread the lifesaving information about the health benefits of vitamins and other natural therapies.**
- **Promote the eradication of heart disease and other diseases by all means available.**

About the Author

Matthias Rath, M.D. is the world-renowned physician and scientist who led the breakthrough in the natural prevention and treatment of atherosclerosis — the underlying cause of heart attacks and strokes. For this breakthrough, he was awarded the world's first patents for the natural reversal of cardiovascular disease.

Dr. Rath is founder of Cellular Medicine, the fundamentally new scientific understanding that today's most common diseases — including heart disease and cancer — are the consequence of the long-term deficiency of certain vitamins, minerals and other biocatalysts for the metabolism of millions of cells in our bodies.

Dr. Rath's scientific publications have been published in leading international scientific journals, including the American Heart Association's *Arteriosclerosis* and the *Proceedings of the National Academy of Sciences, USA*. His books have been translated into more than 10 languages, and millions of copies have been sold worldwide.

Dr. Rath is the founder and head of an international research and development institute that has as its goal the eradication of today's most common health problems with Cellular Medicine and effective and safe natural therapies.

Dr. Rath's breakthroughs in the effective natural control of heart disease and other conditions have become a threat to the trillion dollar pharmaceutical "business with disease," which is merely based on symptom-oriented, synthetic drugs. As a direct consequence, the drug companies have launched a global campaign to establish "protectionist laws" for their drug markets. Their goal is to ban lifesaving natural health information at the expense of human health and lives.

Dr. Rath's website www.drath.com is the world's leading source of Cellular Medicine and natural health information.



I find inspiration for my work in nature. While surrounded by the natural world and quiet solitude, I have done my most creative thinking.

Acknowledgments

My thanks go to all for without whom the medical breakthrough toward the control of cardiovascular disease would have been delayed by many years: to Dr. Aleksandra Niedzwiecki, my long-time colleague and the entire team of researchers at our Institute, to our employees, to the members of our Health Alliance and to the millions of people and friends worldwide who have been supporting me in this global struggle for the liberation of human health.

My thanks also go to all those who have remained an invaluable source of motivation for me through their skepticism and opposition.

Nutritional Supplement Program Halts Progression of Early Coronary Atherosclerosis

Documented by Ultrafast Computed Tomography

Matthias Rath, M.D. and Aleksandra Niedzwiecki, Ph.D.

ABSTRACT: The aim of this study was to determine the effect of a defined nutritional supplement program on the natural progression of coronary artery disease. This nutritional supplement program was composed of vitamins, amino acids, minerals, and trace elements, including a combination of essential nutrients patented for use in the prevention and reversal of cardiovascular disease. The study was designed as a prospective intervention before-after trial over a 12-month period and included 55 outpatients ages 44-67 with various stages of coronary heart disease. Changes in the progression of coronary artery calcification before and during the nutritional supplement intervention were determined by Ultrafast Computed Tomography (Ultrafast CT). The natural progression rate of coronary artery calcification before the intervention averaged 44% per year. The progression of coronary artery calcification decreased on average 15% over the course of one year of nutritional supplementation. In a subgroup of patients with early stages of coronary artery disease, a statistically significant decrease occurred, and no further progression of coronary calcification was observed. In individual cases, reversal and complete disappearance of previously existing coronary calcifications were documented. This is the first clinical study documenting the effectiveness of a defined nutritional supplement program in halting early forms of coronary artery disease within one year. The nutritional supplement program tested here should be considered an effective and safe approach for the prevention and adjunct therapy of cardiovascular disease.

Key words: Coronary heart disease, Ultrafast Computed Tomography, nutritional supplements

INTRODUCTION

According to the World Health Organization, over 12 million people die every year from heart attacks, strokes and other forms of cardiovascular disease.¹ The direct and indirect costs for treatment of cardiovascular disease are the single largest health care expense in every industrialized country of the world. Despite modest success in some countries in lowering the mortality rate from heart attacks and strokes, the cardiovascular epidemic is still expanding on a worldwide scale.

Current concepts of the pathogenesis of cardiovascular disease focus on elevated plasma risk factors damaging the vascular wall and thereby initiating atherogenesis and cardiovascular disease.²⁻⁴ Accordingly, drugs lowering cholesterol and modulating other plasma risk factors have become a predominant therapeutic approach in the prevention of cardiovascular disease.

A new scientific rationale about the initiation of atherosclerosis and cardiovascular disease was proposed by one of us^{5,6}. It can be summarized as follows: cardiovascular disease is primarily caused by chronic deficiencies of vitamins and other essential nutrients with defined biochemical properties, such as coenzymes, cellular energy carriers, and antioxidants.^{7,8} Chronic depletion of these essential nutrients in endothelial and vascular smooth muscle cells impairs their physiological function. For example, chronic ascorbate deficiency, similar to early scurvy, leads to morphological

impairment of the vascular wall and endothelial microlesions, histological hallmarks of early atherosclerosis.⁹⁻¹¹ Consequently, atherosclerotic plaques develop as the result of an overcompensating repair mechanism comprising deposition of systemic plasma factors as well local cellular responses in the vascular wall.^{5,6} This repair mechanism is primarily exacerbated at sites of hemodynamic stress, explaining the predominantly local development of atherosclerotic plaques in coronary arteries and myocardial infarction as the most frequent clinical manifestation of cardiovascular disease.

Animal studies have confirmed this scientific rationale resulting in patents for the combination of ascorbate with other essential nutrients in the prevention and treatment of cardiovascular disease.¹² Based on this patented technology, we have developed a nutritional supplement program, which was tested in this study in patients with coronary heart disease.

SUBJECTS AND METHODS

Patients

A total of 55 patients, 50 men and 5 women, with documented coronary artery disease assessed by Ultrafast CT were recruited for the study. The inclusion criterion was the availability of a high quality Ultrafast CT scan from a previous visit to the Heart Scan facility in South San Francisco. At the beginning of the study each patient completed a comprehensive questionnaire,

which was updated after six months and after 12 months. This questionnaire included medical history, previous cardiac events, and cardiovascular risk factors, as well as individual life style data. Specific questions related to the patients' regular diet, such as strictly vegetarian diet, predominantly fruits and vegetables, predominantly meat, fish or poultry; the daily intake of different vitamins and other essential nutrients; and the frequency of physical exercise by the patient. The laboratory tests available documented a heterogeneous population with respect to plasma cholesterol and triglycerides. About half of the patients were taking different types of prescription medication, including calcium antagonists, nitrates, beta-blockers, and cholesterol-lowering drugs. Before entering the study, the patients were instructed not to change their diet or lifestyle other than adding the nutritional supplement program tested. Any changes were to be documented in their questionnaires. Compliance with the nutritional supplement program was monitored in the questionnaires, through telephone calls and during the control visits.

Composition and Administration of Nutritional Supplement Program

The following daily dosages of nutritional supplements were taken for a period of one year: **Vitamins:** Vitamin C 2700 mg, Vitamin E (d-Alpha-Tocopherol) 600 IU, Vitamin A (as Beta-Carotene) 7,500 IU, Vitamin B-1 (Thiamine) 30 mg, Vitamin B-2 (Riboflavin) 30 mg, Vitamin B-3 (as Niacin and Niacinamide) 195 mg, Vitamin B-5 (Pantothenate) 180 mg, Vitamin B-6 (Pyridoxine) 45 mg, Vitamin B-12 (Cyanocobalamin) 90 mcg, Vitamin D (Cholecalciferol) 600 IU. **Minerals:** Calcium 150 mg, Magnesium 180 mg, Potassium 90 mg, Phosphate 60 mg, Zinc 30 mg, Manganese 6 mg, Copper 1500 mcg, Selenium 90 mcg, Chromium 45 mcg, Molybdenum 18 mcg. **Amino acids:** L-Proline 450 mg, L-Lysine 450 mg, L-Carnitine 150 mg, L-Arginine 150 mg, L-Cysteine 150 mg. **Coenzymes and other nutrients:** Folic Acid 390 mcg, Biotin 300 mcg, Inositol 150 mg, Coenzyme Q-10 30 mg, Pycnogenol 30 mg, and Citrus Bioflavonoids 450 mg. Further information at: www.drath.com

Monitoring of Coronary Artery Disease

The extent of coronary calcification was measured non-invasively with an Imatron C-100 Ultrafast CT scanner in the high-resolution volume mode, using a 100-millisecond exposure time. ECG triggering was used so that each image was obtained at the same point in the diastole, corresponding to 80% of the RR interval. In each scan, 30 consecutive images were obtained at 3mm intervals beginning 1 cm below the carina and progressing caudally to include the entire length of the coronary arteries. The scans at study entry and after 6 and 12 months of the study included a second scan sequence of 30 images at 3 mm intervals across the entire heart. The 30 images of the second scan were taken between the 3 mm intervals of the first scan resulting in a scanning of the heart at an interval of 1.5 mm. Total radiation exposure using this technique was <1rad per patient (<.01Gy).

The scan threshold was set at 130 Hounsfield units (Hu) for identification of calcified lesions. The minimum area to differentiate calcified lesions from CT artifact was 0.68 mm². The lesion score, also designated Coronary Artery Scanning (CAS) score, was calculated by multiplying the lesion area by a density factor derived from the maximal Hounsfield unit within this area.¹³ The density factor was assigned in the following way: 1 for lesions with a maximal density with 130-199 Hu, 2 for lesions with 200-299 Hu, 3 for lesions with 300-399 Hu and 4 for lesions > 400 Hu. The total calcium areas and CAS scores of each Ultrafast CT scan were determined by summing individual lesion areas or scores from the left main, left anterior descending, circumflex, and right coronary artery.

Several studies have confirmed an excellent correlation of the extent of coronary artery disease as assessed by Ultrafast CT scanning when compared to angiographic and histomorphometric methods.¹³⁻¹⁵ Considering the accuracy and the non-invasive approach, Ultrafast CT was the method of choice for an intervention study that included early, asymptomatic stages of coronary artery disease.

Table 1: Clinical data of study participants from patient protocol at study onset

		All Patients (n=55)		Patients With Starting Coronary Sclerosis (n=21)	
Age:	40-49	5	(9%)	4	(8%)
	50-59	24	(44%)	8	(40%)
	60-69	26	(47%)	9	(52%)
Smoker		4	(7%)	1	(5%)
Ex-smoker		36	(65%)	12	(57%)
Diabetic		4	(7%)	0	(0%)
Pancreas failure		3	(5%)	1	(5%)
Heart attack		5	(9%)	0	(0%)
Angioplasty, balloon catheter		2	(4%)	1	(5%)
Use of medications		27	(49%)	7	(33%)
Use of vitamins		36	(65%)	15	(71%)

Statistical Analysis

The growth rate of coronary calcifications was calculated as the quotient of the differences in the calcification areas or CAS scores between two scans divided by the months between these scans according to the formula $(Area2-Area1):(Date2-Date1)$, or $(CAS\ score\ 2-CAS\ score1):(Date2-Date1)$ respectively. The data were analyzed using standard formulas for means, medians, and standard error of the means (SEM). Pearson's correlation coefficient was used to determine the association between continuous variables. One tailed Student t-test was used to analyze differences between mean values, with a significance defined at <0.5 . Progression of calcification was predicted by linear extrapolation. The distribution of the growth rate of CAS scores was described by a smooth curve resulting from a third order polynomial fit $(y=a + bx^3)$, where $a = 0.9352959$, $b = 8.8235 \times 10^{-5}$.

RESULTS

The aim of this study was to determine the effect of a defined nutritional supplement program on the natural progression of coronary artery calcification particularly in its initial stages as measured by Ultrafast CT. We therefore evaluated the results of the entire study group (n=55) and of a subgroup of 21 patients with early coronary artery calcification, as defined by a CAS score of <100 .

Table 2 separately lists the characteristics of the study population assessed by the questionnaire for all patients and for a subgroup with early coronary artery disease.

This is the first intervention study using Imatron's Ultrafast CT technology. One of the first aims of this

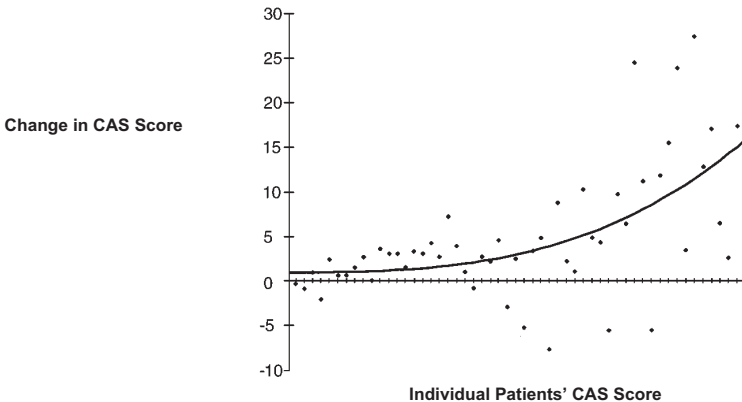
study was to determine the rate of natural progression of coronary calcium deposits *in situ*, without the intervention of the nutritional supplement program. Figure 1 shows the distribution of the monthly progression of calcifications in the coronary arteries of all 55 patients in relation to their CAS score at study entry.

We found that the higher the CAS score was initially, without intervention, the faster the coronary calcification progressed. Accordingly, the average monthly growth rate of coronary calcifications ranged from 1 CAS score per month in patients with early coronary heart disease to more than 15 CAS score per month in patients with advanced stages of coronary calcifications. The growth pattern of coronary calcifications can be described as a third order polynomial fit curve. The exponential shape of this curve signifies a first quantification of the aggressive nature of coronary atherosclerosis and emphasizes the importance of early intervention.

The changes in the natural progression rate of coronary artery calcification before the nutritional supplement program (-NS) and after one year on this program (+NS) are shown in Figure 2. The results are presented separately for the calcified area and the CAS score.

As presented in Figure 2a the average monthly growth of calcified areas for all 55 patients decreased from 1.24 mm²/month (SEM +/- 0.3) before the nutritional supplement program (-NS) to 1.05 mm²/month (+/- 0.2) after one year on this program (+NS). For patients with early coronary artery disease (Figure 2b), the average monthly growth of the calcified area decreased from 0.49 mm²/month (+/- 0.16) before taking the nutritional supplements (-NS) to 0.28 mm²/month (+/- 0.09) after one year on this program (+NS).

Figure 1. Distribution of monthly increase in CAS scores in relation to CAS scores at study entry. The data represent all 55 patients individually. The calcification rate distribution pattern can be described by the polynomial curve: $y=a + bx^3$, where $a = 0.9352959$, $b = 8.8235 \times 10^{-5}$.

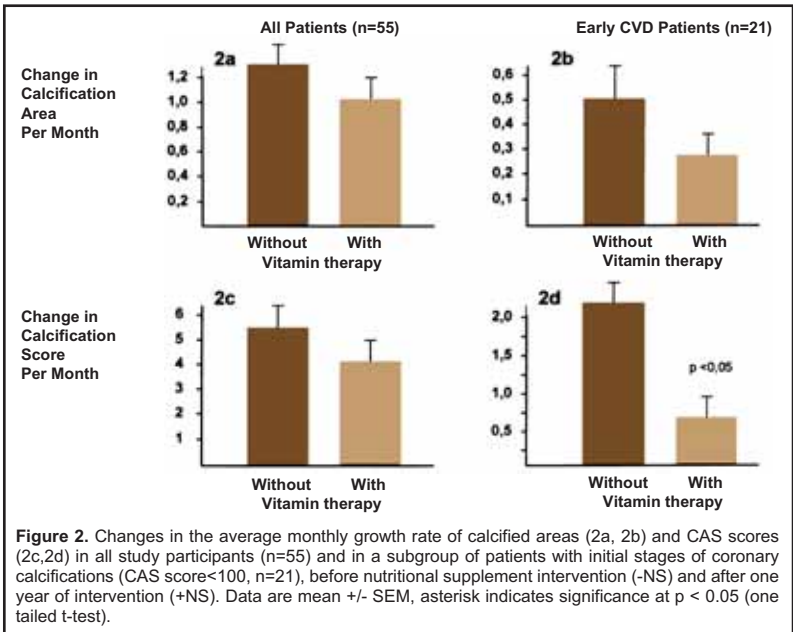


As shown in Figure 2c the average monthly changes in the total CAS score (calcified area X density of calcium deposits) for all 55 patients had decreased after one year on the nutritional supplement program by 11%, from 4.8 CAS score/month (SEM +/-0.97) before the program (-NS) to 4.27 CAS score /month(+/- 0.87) (+NS). In patients with early coronary artery disease (Figure 2d) the average monthly growth of the total CAS score decreased during the same time by as much as 65%, from 1.85 CAS score /month (+/-0.49) before the nutritional supplement program (-NS) to 0.65 CAS score /month (+/- 0.36) on this program (+NS). The slow-down of the progression of coronary calcification during this nutritional supplement intervention for CAS scores of patients with early coronary artery disease was statistically significant ($p < 0.05$) (Figure 2d). For the other three sets of data the decrease of coronary calcifications with the nutritional supplement program was evident; however, largely due to the wide range of calcification values at study entry reflecting the different stages of coronary artery disease, it did not reach statistical significance.

It is noteworthy that the decrease in the CAS scores during intervention with nutritional supplements were more pronounced than for the calcified areas. This indicates a decrease in the density of calcium in addition to a reduction in the area of coronary calcium deposits during nutritional supplement intervention.

Ultrafast CT scans at the beginning of the study and after 12 months on the nutritional supplement program, were complemented by a control scan after 6 months, allowing for additional insight into the time required for the nutritional supplements to exert their therapeutic effect. This additional evaluation was particularly important for early forms of coronary artery disease, because any therapeutic approach that can halt progression of early coronary calcification would ultimately prevent myocardial infarctions.

Figure 3 shows the average coronary calcification areas (Figure 3a) and total CAS scores (Figure 3b) for patients with early coronary artery disease measured during different scanning dates before and during the course of the study. The actual coronary calcification values for areas and total CAS scores during nutritional supplement intervention are compared to the predicted values obtained from linear extrapolation of the growth rate without intervention. The letters A to D mark the different time points at which Ultrafast CT scans were performed. AB represents the changes in coronary calcification before intervention with nutritional supplement for the areas (Figure 3a) and CAS scores (Figure 3b). Accordingly, BC represents calcification changes during the first six months on the nutritional supplement program and CD changes during the second six months on the program. The calculated progression rate for coronary calcifications without therapeutic intervention by the nutritional supplement program is



marked by a dotted line (B through F).

As seen in Figure 3a without the nutritional supplement program, the average area of coronary calcifications in patients with early coronary artery disease increased from 17.62 mm² (+/- 1.0) at time point A to 23.05 mm² (+/- 1.8) at time point B. Thus, the annual extension of calcified areas without intervention was assessed with 31 %. At this progression rate, the average calcified area would reach 26.3 mm² after six months (point E) and 29.8 mm² after twelve months (point F). The nutritional supplement intervention, resulted in an average calcified area of 25.2 mm² (+/- 2.2) after six months and of 27.0 mm² (+/-1.7) after 12 months, reflecting a 10% decrease compared to the predicted value.

Analogue observations were made for the total CAS before and during the nutritional supplement program. Figure 3.b shows that the CAS score before the nutritional supplement program increased by 44% per year, from 45.8 (+/- 3.2) (point A) to 65.9 mm² (+/- 5.2) (point B). At this progression rate the total CAS score, without the nutritional supplement program, would reach an average of 77.9 after six months (point E) and of 91 (point F) after 12 months. In contrast to this trend the actual CAS score values measured with the nutritional supplement program were 75.8 (+/-6.2) after 6 months (point C) and 78.1 (+/-5.1) after 12 months (point D). Thus, the progression of coronary calcification as determined by the total CAS scores decreased significantly during the second six months of nutritional supplement intervention (CD). The total score after twelve months on the nutritional supplement program was only 3% higher than after six months (CD), as compared to the projected increase of 17% (EF), indicating that during the second six months on the nutri-

tional supplement program the process of coronary calcification has practically stopped.

Figure 4 shows the actual Ultrafast CT scans of a 51-year-old patient with early, asymptomatic, coronary artery disease. The patients' first Ultrafast CT scan was performed in 1993 as part of an annual routine check-up. The scan film revealed small calcifications in the left anterior descending coronary artery as well as in the right coronary artery. The second CT scan was performed one year later at which time the initial calcium deposits had further increased. Figure 4a shows two Ultrafast CT scan images taken before the nutritional supplement program.

Subsequently, the patient started on the nutritional supplement program. About one year later the patient received a control scan. At this time point, coronary calcifications were not found (Figure 4b.), indicating the natural reversal of coronary artery disease.

DISCUSSION

This is the first study that provides quantifiable data from *in situ* measurements about the natural progression rate of coronary artery disease. Although atherosclerotic plaques have a complex histomorphological composition, calcium dispersion within these plaques has been shown to be an excellent marker for their advancement.^{11,13} Our study determined that the calcified vascular areas expand at a rate between 5 mm² (early atherosclerotic lesions) and 40 mm² (advanced atherosclerotic lesions). Before the nutritional supplement program the average annual increase of total coronary calcification was 44% (Figure 1). Considering

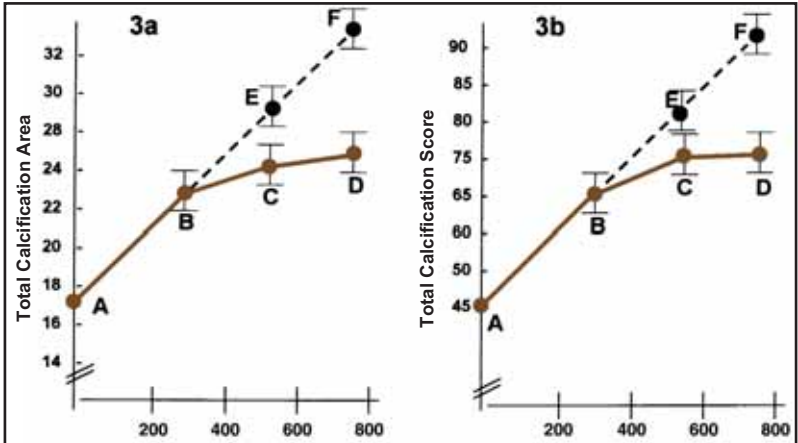


Figure 3. Actual progression of coronary calcification areas and CAS scores before and during one year of nutritional supplement intervention in a subgroup of patients with initial stages of coronary calcification (CAS <100), compared to calculated progression without intervention (dotted line). Each data point represents the mean value +/- SEM.

the exponential increase of coronary calcification, it is evident that the control of cardiovascular disease has to focus on early diagnosis and early intervention.

Today, the diagnostic assessment of individual cardiovascular risk is largely confined to the measurement of plasma cholesterol and other risk factors with little correlation to the extent of atherosclerotic plaques. More accurate methods, such as coronary angiography, are confined to advanced, symptomatic, stages of coronary artery disease. Ultrafast CT provides the diagnostic option to quantify coronary artery disease non-invasively in its early stages.^{14,15}

The most important finding of this study is that coronary artery disease can be effectively prevented and treated by natural means. This nutritional supplement program was able to decrease the progression of coronary artery disease within the relatively short time of one year, irrespective of the stage of this disease. Most significantly, in patients with early coronary calcifications this nutritional supplement program was able to essentially stop its further progression. In individual cases with small calcified deposits, nutritional supplement intervention led to their complete disappearance (Figure 4).

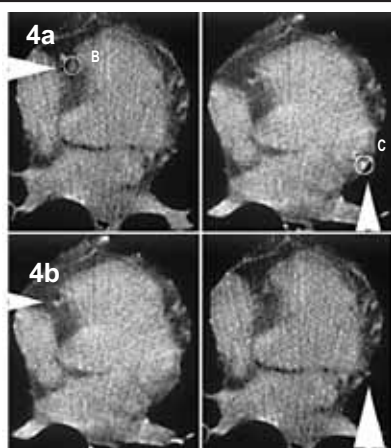
We postulate that the nutritional supplement program tested in this study initiates the reconstitution of the vascular wall. Restructuring of the vascular matrix is facilitated by several nutrients tested, such as ascorbate (vitamin C), pyridoxine (vitamin B-6), L-lysine, and L-proline, as well as the trace element copper. Ascorbate is essential for the synthesis and hydroxylation of collagen and other matrix components,¹⁶⁻¹⁸ and can be directly and indirectly involved in a variety of regulatory mechanisms in the vascular wall from cell differen-

tiation to distribution of growth factors.^{19,20} Pyridoxine and copper are essential for the proper cross-linking of matrix components.⁹ L-lysine and L-proline are important substrates for the biosynthesis of matrix proteins; they also competitively inhibit the binding of lipoprotein(a) to the vascular matrix, facilitating the release of lipoprotein(a) and other lipoproteins from the vascular wall.^{5,12,21} Ascorbate and -tocopherol have been shown to inhibit the proliferation of vascular smooth muscle cells.²²⁻²⁴ Moreover, tocopherols, beta-carotene, ascorbate, selenium and other antioxidants scavenge free radicals and protect plasma constituents, as well as vascular tissue, from oxidative damage.^{25,26} In addition, nicotinate, riboflavin, pantothenate, carnitine, coenzyme Q-10, as well as many minerals and trace elements, function as cellular cofactors in form of NADH, NADPH, FADH, Coenzyme A and other cellular energy carriers.⁸ The results of this study confirm that maintaining the integrity and physiological function of the vascular wall is the key therapeutic target in controlling cardiovascular disease. This also corroborates early angiographic findings that supplemental vitamin C may halt the progression of atherosclerosis in femoral arteries.²⁷

These conclusions are even more relevant since deficiencies of essential nutrients are common.^{28,29} Moreover, many epidemiological and clinical studies have already documented the benefits of individual nutrients in the prevention of cardiovascular disease.³⁰⁻³⁵ Compared to the high dosages of vitamins used in some of these studies the amounts of nutrients used in this study are moderate, indicating the synergistic effect of this program.

In this context, it seems appropriate to critically review some of the approaches currently used in the

Figure 4. Ultrafast CT scan images of a 50-year-old patient with asymptomatic coronary artery disease before the nutritional supplement program (top row) and approximately one year later (bottom row). Calcium deposits in the left descending coronary artery and in the right coronary artery are visible as white areas.



primary and secondary prevention of cardiovascular disease, including the extensive use of cholesterol-lowering drugs. An intervention study including lovastatin was performed with a highly selected group of hyperlipidemic patients, representing only an extremely narrow fraction of a normal population.³⁶ More recently, the reduction of myocardial infarctions and other cardiac events in patients taking simvastatin, led to recommendations for its long-term use even by normolipidemic patients.³⁷ However, because of their potential side-effects, the recommended use of these drugs has now been restricted to patients at high short-term risk for coronary heart disease.³⁸

Similarly, certain natural approaches to prevention of cardiovascular disease deserve a critical review. A program of rigorous diet and exercise program claims to be able to reverse coronary heart disease.³⁹ However, the published study does not provide compelling evidence documenting the regression of coronary atherosclerosis. Thus, the improved myocardial perfusion shown in that study, was likely the result of the physical training program, leading to an increased ventricular ejection fraction and an increased coronary perfusion pressure.

Considering the urgent need for effective and safe public health measures towards the control of cardiovascular disease, the validity of this study is of particular importance. In light of this, the following study elements are noteworthy:

1. The patients in this study served as their own controls before and during nutritional supplement intervention, thereby minimizing undesired co-variables such as age, gender, genetic predisposition, diet or medication.
2. Ultrafast CT has been extensively validated to assess the degree of coronary atherosclerosis, and it allowed quantification of coronary atherosclerotic plaques *in situ*.¹³⁻¹⁵ This diagnostic technique also minimizes errors as they occur in angiography studies in which vasospasms, formation or lysis of thrombi, and other events cannot be differentiated from progression or regression of atherosclerotic plaques. Moreover, Ultrafast CT provides valuable information about the morphological changes during progression and regression of atherosclerotic plaques, by quantifying not only the area of coronary calcifications but also their density. Furthermore, the automatic CT measurements of coronary calcifications eliminates human error in the evaluation of the data.

In summary, the results of this study imply that coronary heart disease is a preventable and essentially reversible condition. This study documents that coronary artery disease could be halted in its early stages by following this nutritional supplement program. These results were achieved within one year, suggesting that additional therapeutic benefits in patients with advanced coronary artery disease can be obtained by an extended use of this program. The continuation of this study is currently under way to document these effects. This nutritional supplement program signifies an

effective and safe approach for the prevention and adjunct therapy of cardiovascular disease. This study should encourage public health policy makers and health care providers to redefine health strategies towards the control of cardiovascular disease.

ACKNOWLEDGEMENTS

We are grateful to Jeffrey Kamradt for his help in coordinating this study. Douglas Boyd, Ph.D., Lew Meyer, Ph.D. from Imatron/HeartScan., South San Francisco, for helping to plan the study and providing the HeartScan facility; Lauranne Cox, Susan Brody, and Tom Caruso for their collaboration in conducting the heart scans. Dr. Roger Barth and Bernard Murphy for their assistance in planning the study, as well as to Martha Best for her secretarial assistance.

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Notes

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