

How I came to work with Linus Pauling

I had known Linus Pauling from the times when I was a medical student. I first met him at a conference on the island of Mainau in Southern Germany. At this conference young scientists had the opportunity to meet with Nobel Laureates. Later I met Linus again during the Nuclear Freeze movement and in 1983 I was accompanying him on a lecture tour, where he also talked about his Nobel Peace Prize for helping to bring about the atmospheric nuclear test ban treaty. I continued to see Linus several times during the 1980s but none of the meetings was as crucial as the one at his ranch in Big Sur in late autumn of 1989.

The last two weeks in October that year I made a lecture tour through the United States, presenting the work on athero-



*Linus Pauling's ranch on the shores
of the Pacific Ocean*

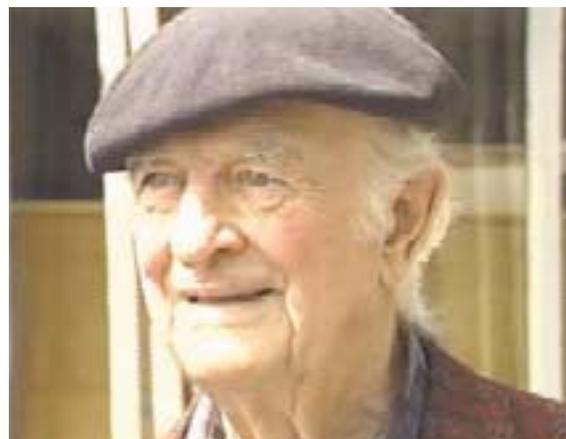
sclerosis and new risk factor lipoprotein(a) that had just been published in *Arteriosclerosis*, the journal of the American Heart Association. I had been invited to present this exciting research at the Metabolic Disease branch of the National Institutes of Health in Bethesda, at the Medical School of the University of Chicago, at the Baylor College of Medicine in Houston, the Arteriosclerosis Research Department at the University of California in La Jolla and at Genentech, the famous biotech company in San Francisco. The lipoprotein(a) story was “hot news” at those ivory league research centers but any connection to vitamin metabolism was ignored.

On the last weekend that October I had arranged a visit with Linus Pauling at his ranch in Big Sur. I had sent a copy of my publications and some supporting materials to his institute - but they had never reached him. On that Saturday I drove from San Francisco - where I had given a lecture at Genentech on Friday - to Big Sur. It was a beautiful 4 hour drive South on scenic Highway 1 along the Pacific coast. I had visited Linus at his ranch before, but this time - I knew - would be different.

After passing the cattle gates on the small windy road from Highway 1 down to his ranch, I finally reached the wooden ranch house that Linus had chosen as his refuge for the last decades of his life. The door of his house was never locked and I entered, making my way through mountains of scientific journals that had piled up over many years along the hallway connecting the entrance with the living room. Linus was sitting in a wire chair that apparently had survived several decades. The living room looked like the epicenter of a continuous scientific whirlwind. There were books, scientific articles and handwritten notes lying around about one of the unsolved puzzles in physics, the atomic structure of quasi crystals. Linus had been working for the past months identi-

fying these structures - using only his mind and a calculator.

Linus had not noticed me coming in. When he did he jumped up “Hello Matthias, good to see you. I understand that today we are talking about your scientific work. I am glad you became a researcher.” With that he moved his chair to the balcony window and offered me the chair opposite him. I



*The two-time Nobel laureate at age 90
in front of his house in Big Sur*

started to talk with Linus about the new risk factors lipoprotein(a) and about my discovery that this molecule only appears in humans and other species that had lost the ability to manufacture their own vitamin C. I immediately came to the point: “Linus there is an obvious connection between lipoprotein(a) and a lack of vitamin C that no one had seen before.” With the waves of the Pacific Ocean smashing against the rocks below, Linus listened and asked questions. He had never heard of lipoprotein(a) before. After about an hour he stood up and said: “Well there are about a thousand

papers on vitamin C each year, what is really new about this?"

It was one of these typical tests by which the eminent scientist who had seen a century in science tested the young scientist about how convinced he was about his own discoveries. Of course I was! I replied: "Linus I would like to make a suggestion, I'll leave these papers here for you to read and I will stay overnight in the Ragged Point Inn. I will come back tomorrow and we can talk some more." I had passed Linus' test and he replied smiling: "Very well." I drove back to Highway 1, convinced that the next day I would know from the brightest scientist alive whether my observations are only coincidence or whether it is a principle of nature

The Ragged Point Inn Motel is several miles south of Linus' ranch directly above the pacific. I stayed there in room No. 11 on the ground floor reading and working late into the night to prepare myself further for next morning's discussion. I knew that the amino acid lysine would possibly block the lipoprotein(a) fat particles from being laid down inside the artery walls. I drew figures, about how the combination of lysine with vitamin C could modify these lysine molecules to hydroxy-lysine possibly preventing blood vessel deposits, heart attacks and strokes.

For California the next morning was the beginning of another beautiful late autumn day. For mankind it was a historic day - the beginning of the end of the cardiovascular epidemic. When I reached Linus' ranch at nine o'clock he was already waiting for me. He jumped up from his chair and welcomed me with excitement. "I read your stuff and it is pretty interesting", he said trying to appear controlled. However, there was no way he could hide his excitement. We talked for another three hours, during which I introduced Linus to the possible therapeutic value of vitamin C in combination with lysine not only to prevent the deposition of this dangerous fat

particle inside the artery walls but also to reverse cardiovascular diseases naturally - by releasing lipoprotein(a) from these deposits.

Linus agreed but he seemed to be more fascinated with the evolutionary connection, the loss of vitamin C production in the ancestor of man and the sudden appearance of lipopro-



*The Linus Pauling Institute
on 440 Page Mill Road in Palo Alto in 1990.
The building was torn down in 1998.*

tein(a) a few hundred thousand generations ago. "Isn't it amazing that this particle popped up in such a short time during evolution" he asked. I realized that Linus looked at scientific problems in a fundamentally different way than all the other scientists I had met. The bandwidth of his brain covered millions of years in evolution as easily as the atomic structure of atoms no one had ever seen.

I felt pretty proud of having excited this scientific giant with my discoveries. This Sunday morning ended in small talk with Linus asking me about continuing my research in

California and even explaining to me the size of his property and the possibility to build one or two more houses on that property. I did not immediately understand the reason why he brought this matter up until much later. He was a scientist buried alive with his life's work on vitamins. He had just met a young scientist with whom he not only shared his views for a better world, but now also a common scientific drive to get the health benefits for vitamins accepted on a worldwide scale.

We parted, with Linus stating: "Matthias this is a very important discovery. But I don't think I should get more involved in this than just talking to you." Apparently, Linus felt he had not contributed to this discovery and that he should rather continue his current research in physics. For me this was all I needed to hear, a confirmation of my discovery as a principle of nature by the two-time Nobel laureate. I literally jumped in my rental car and drove the eight hours South on Highway 1 until I reached San Diego that night. The next day I would have a presentation at the cardiovascular research department of the University of La Jolla. But this was today - my day! I remember honking at cows, seals and just about any other creature that crossed my way South that sunny October afternoon.

Four days later I was back in Berlin, Germany, and another two days later I received a letter from Linus Pauling. He had given up his portrayed indifference and given way to open enthusiasm. He proposed to immediately write a scientific publication for the Proceedings of the National Academy of Science about the connection between lipoprotein(a) and vitamin C deficiency. More importantly he invited me to join his institute, start a cardiovascular research group and become his personal collaborator.

Of course, Linus did not escape the dreadful state of affairs

at his institute at that time. In his letter I found the sentence "I even think we have a ultracentrifuge at the institute." The availability of an ultracentrifuge, of course, was just about the minimum equipment for any reputable research laboratory. I knew, the research possibilities at Linus' institute would be very limited.

I slept over this gracious invitation for a night and the next day I called Linus. I thanked him for the invitation but turned it down. I had decided to continue this research project at the Baylor College of Medicine in Houston, one of the ivory league medical institutions in the country. My explanation to Linus was straight forward: "Linus, if I come to work with you on vitamin C it is like all Catholics moving to the Vatican. I want to take vitamin research into established medicine in order to accelerate its acceptance for mainstream medicine." After a long pause, Linus responded noticeably disappointed and somehow tired: "Very well." I had made my decision at that time.

Little did I know that this decision would not last more than 6 weeks. After a short interlude at the Baylor College of Medicine in January 1990 my fascination to become the personal collaborator of a two-time Nobel Laureate was overwhelming. I packed my suitcases and moved from Houston to Palo Alto.

Working at the Linus Pauling Institute

I remember the day in early 1990 when I drove into Palo Alto on Page Mill Road having just dismantled my tents in Houston. I was full of ideas, plans determination to swiftly confirm this principle of nature at the experimental level at the Pauling Institute.

At 440 Page Mill Road I stopped my car. This was the Linus Pauling Institute where I had been several times before meeting with Linus during my student times. This time it was different. Here would be my new workplace and one of the greatest rides in the history of medical science was waiting for me. I was excited.

Besides Linus, no one knew about the forthcoming scientific earthquake and the sequence of explosion that would detonate at this rather uneventful institute. In order to cover the true nature of this discovery and to protect it from curious colleagues, Linus and I agreed on code language about this project. Even the lecture I had given in early January to the employees of the Pauling Institute had been on the lipoprotein(a) work alone - without mentioning any connection to vitamin C which of course was the truly exciting part of it.

The next morning Linus and I met with the President of the Linus Pauling Institute. Linus addressed him directly: "I want everyone at the institute to know that Matthias is my personal protégé." Later I realized that the two-time Nobel Laureate had made this statement not only based on his friendship and common scientific interests with me but also because he was aware that his institute had become a minefield.

For two decades the Pauling Institute had been in existence

but had lost its profile of being a vitamin research institute. Only one out of ten researchers even worked on vitamin C and millions of dollars in donations from around the world



Colleagues from the Linus Pauling Institute at the Nobel laureate's 90th birthday in 1991. Several of them later joined Dr. Rath's research firm and work with him until today. Among them Dr. Alexandra Niedzwiecki (beside Linus Pauling) and Martha Best (same row far left). At the center of the bottom row is Dorothy Munro, Linus Pauling's secretary during two decades..

were wasted for research not even remotely related to documenting the health benefits of vitamins. Linus' last book "How to live longer and feel better" listed two hundred supporting references but less than a handful came from his own institute! Clearly, the Nobel Laureate had entrusted his institute into the hands of people who were shy of leading the battle for the acceptance of vitamins for health! Tens of thousands of readers of Linus Pauling's books connected his name with ongoing vitamin research, but the administration of his institute was ashamed of controversies and taking up the good fight for natural health.

In this situation, Linus at age 90, had obviously realized what could be his last opportunity to find a young and enthusiastic researcher to carry on his life's work. However, his announcement of me as his personal protégé could not have been more threatening to the existing leadership of the Linus Pauling Institute. And I should soon feel the consequences. Instead of getting a decent work place with a desk and chair I was allocated the corner seat in the windowless storage area of the Pauling Institute. My request to the institute's administration for a research assistant who could help in laboratory was met with the argument that the institute does not have money. Not willing to give up, I trained the janitor to run the electrophoresis experiments in the laboratory so I could concentrate on elaborating the details of this medical breakthrough. Weeks, perhaps months were lost and it was not until a year later that I finally got a qualified research assistant.

Key experiments for the medical breakthrough

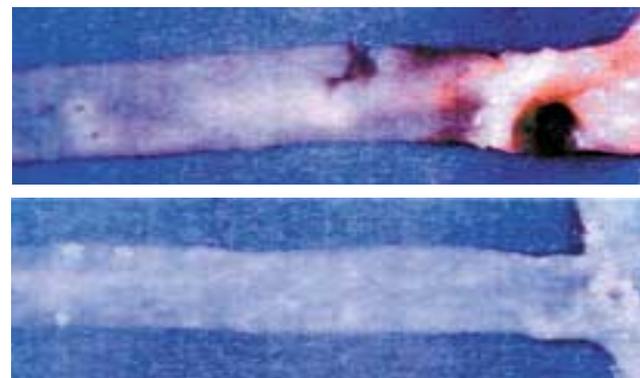
Well the scientific concept of the vitamin C- lipoprotein(a) connection had already been made. The door was wide open but I needed more scientific proof. But I was not to be deterred. I set up a study with guinea pigs, an animal model that shares the same genetic defect as human beings. They cannot produce their own vitamin C. The experiment was straight forward. My theory was that guinea pigs develop arteriosclerotic deposits once they are put on a vitamin C deficient diet. Moreover, by analyzing the deposit in the artery walls we would find the sticky lipoprotein(a) fat molecules.

The significance of this key experiment for the lives and health of millions of people could not be underestimated. This experiment would allow the conclusion, that a similar

mechanism takes place in the human body. The lack of vitamin C would weaken the blood vessel walls similar to scurvy, the sailor's disease and subsequently lipoprotein(a), cholesterol and other risk factors in the blood would be deposited inside the artery walls in a desperate effort to mend this wall. That would prove that the fatty deposits in the arteries are no longer a coincidence or just 'fate', but that cardiovascular diseases develop as an inevitable response of our body to repair the blood vessel walls weakened by vitamin deficiency.

The moment of truth

This key experiment was carried out over five weeks, one of the longest five weeks in my life. Of course, animal experiments have to be kept to absolute minimum, but since this experiment would have meaning for health and lives of millions of people it had been approved by the animal care committee of the institute. I still remember the day when the



Top: Guinea pigs receiving too little vitamin C in the diet develop cardiovascular disease

Bottom: Guinea pigs receiving optimum vitamin C have clean arteries

experiment was over and I looked at the artery walls of the guinea pigs under the microscope. The guinea pigs were receiving vitamin C comparable to the human RDA had developed the same deposits in the artery walls that caused heart attacks and strokes in human beings. Those animals that had received two teaspoons full of vitamin C per day, comparable to the human body weight, had maintained clean arteries. Most importantly, this striking difference was not obtained by *adding* cholesterol or fat to the diet but by *omitting* one single factor from the diet /Vitamin C.

That day I felt like Columbus must have felt at the first sight of land in 1492 - after years of struggle and overcoming adversities. I went to Dorothy Munroe, the secretary of 17 years to Linus Pauling and asked her where I could reach Linus to share the exciting news with him. She noticed my excitement and said: "Go right in, he is in his office". I didn't even care to close the door behind me and shouted: "Linus, you got to come and see this!"

He had been dictating letters and correspondence in his typical posture half lying in his chair with his feet on the desk and his black beret drawn deep over his eyes in order to dim the neon light of his office. He literally jumped up adjusted his beret and walked with me to the room where the guinea pig arteries were placed under the microscope. The visibly documented results left no doubt: Optimal amount of vitamin C was the solution to the cardiovascular epidemic.

After looking through the microscope for a few minutes, Linus rose, turned around and beamed at me: "I am happy as a clam". He took me by the arm and we went to his office to immediately discuss the next steps as well as the implications for human health.

That evening, when I drove home along El Camino Real from

Palo Alto to Menlo Park I knew that medicine would never again be the same. Thoughts were appearing like flashes in my mind and a breathtaking perspective was opening up. I saw people around the world embracing this discovery and researchers tuning in to further confirm them at all levels. I imagined the morning news opening up with the headline: "Heart disease close to eradication". I could see a new research institute rising into the sky. How could I know that the fight for the acceptance of this simple truth had just began and years of fierce battles lay ahead of me.

Irritation Everywhere

The first reactions to this medical breakthrough, the publications and the lipoprotein(a)/vitamin C connection were sheer irritation. Imagine the times in 1991. The world was in full swing on the cholesterol/heart disease connection. Every major pharmaceutical company had invested multi-million dollar advertising budgets for new cholesterol-lowering drugs in the hope of capitalizing on the illusion of combating heart disease by lowering cholesterol. Only the top one percent of the research community had even heard about lipoprotein(a) and accepted the fact that it is a ten times greater risk factor for heart disease than cholesterol.

And now, along comes a young German scientist publishing the outrageous conclusion that this prominent risk factor, lipoprotein(a), can be successfully neutralized by optimum intake of vitamin C. Moreover, with a flash of his scientific mind he shook almost every scientific explanation for heart disease that had existed since the beginning of time. To top it off, for these bold conclusions he got the support of Linus Pauling, the only scientist ever to receive two unshared Nobel Prizes.

Only during the times of Harvey, Pasteur, and a few others, had the medical world been as challenged as it was during the year 1990-91.

Both Linus and I were fully aware of the significance of these discoveries. Before one of the inevitable business negotiations Linus said: "I can't give you any specific advice. You have to use your own judgment. But no matter what happens, never forget that your discovery is one of the most important discoveries in medicine ever." Even more surprising was the fact that a public debate about this breakthrough essentially did not take place. Only later would I understand the reason why.

The business with disease maintained by the pharmaceutical industry was the most lucrative business on our planet. The single largest market segment of this "business with disease" was the global market of pharmaceutical drugs alleviating the symptoms of cardiovascular disease without curing it. A public debate in mass media about the vitamin C/scurvy/heart disease connection would have decimated this business within months and meant that the pharmaceutical industry would lose hundreds of millions of dollars. This was not to be.

Instead, the reactions at this time were a mixture of astonishment, irritation, and desperate efforts to contain the bush fire started by this medical breakthrough. As we shall see throughout this book, it was a mixture of containing the spread of the message that the medical world is round and not a plate, combined with economic greed of stratospheric proportions.

Of course, it was clear that neither the pharmaceutical industry nor any of the scientists or doctors on their payroll would be able to publicly contradict the logic of this medical breakthrough. Ever since James Lind showed that lime and lemon juice prevent scurvy it was clear that vitamin C would stabilize the artery wall and therefore also protect it against the damages associated with cardiovascular disease. It was the power of this logic that had the multi-billion dollar pharma-

ceutical "strato-dwellers" shaking in their boots.

Every strategic move they planned during those years was only viable under one condition: it would have to make sure that the information about this medical breakthrough would be contained and no public education about the possibility of eradicating heart disease with vitamins could be spread. Since my discovery was a global threat to the "Business with Disease", the pharmaceutical companies reacted in a global way.

They formed two cartels, one became infamous as the so-called "vitamin cartel," an effort by the manufacturers of vitamin raw materials to participate in this medical breakthrough through criminal price fixing practices. The other became known as the "Pharma-Cartel", an effort by the pharmaceutical industry to limit health claims and the dissemination of any preventive and therapeutic health information on vitamins and other non-patentable natural therapies. The common denominator of these two cartels was that none of them required the release of the medical breakthrough about the role of vitamins in prevention of heart disease, information that hundreds of millions of people were waiting for because it could have saved or prolonged their lives.

As an expression of the erratic behavior of the leading scientists and pharmaceutical companies, I would like to share some of the moments during that year that tell more than any historic analysis the revolution that was going through medicine.

"Cholesterol-popes" and shattered dogma

In 1985 Goldstein and Brown, two researchers from the University of Texas, received the Nobel Prize for discovering a pathway by which cholesterol enters the cells. While this discovery was significant, the Nobel Prize for these two gentlemen was sold by the pharmaceutical companies that manufactured cholesterol-lowering drugs as the final proof for their questionable theory that cholesterol would cause heart disease. Of course, these two researchers were not independent, but had rather lucrative consulting arrangements with a number of pharmaceutical companies, among them Genentech in South San Francisco.

Our first paper about the lipoprotein(a)/vitamin C connection had just been published by the National Academy of Sciences, in May 1990. Shortly thereafter there was a meeting of scientific advisors for Genentech, at which Goldstein and Brown participated. According to eyewitnesses, the two gentlemen had not even sat down when they started to ask everyone in the room whether they had read the Rath/Pauling paper on lipoprotein(a) and vitamin C. For the two scientific gurus who had been the architects of the Babylonian tower of the cholesterol/heart disease connection, this very tower had just experienced a 10.0 earthquake.

Linus and I had great fun thinking about the event at which one of us would first detonate the bomb in person. It is always one thing that a scientific discovery is put down in formal scientific publication, and the other when the discoverer first appears to present it in person. I had a standing invitation to an arteriosclerosis meeting in Venice, Italy in August, 1990. Nearly the entire cream of medical researchers and medical opinion leaders in the area of cholesterol and heart disease were present. Among them were Daniel Steinberg from the University of California in La Jolla

and Toni Gotto, the former president of the American Heart Association, from the Baylor College of Medicine in Houston, Texas.

My talk was on the role of antioxidants in the prevention of cardiovascular disease, and at the end of this talk I mentioned in a few sentences the discovery about lipoprotein(a), vitamin C deficiency and heart disease. During the lunch hour I distributed copies of the publication from the Proceedings of the National Academy of Sciences. From that moment on, the conference was not the same. The mood changed to that of a funeral, and Toni Gotto summarized the mood in his presentation, as follows: "If Rath and Pauling are correct, then everything is different anyway, and of course we have been corrected!" In hindsight the former president of the AMA may have regretted that statement, but at the time it was a genuine expression of the fact that the medical universe had just been redesigned.

Even within the Linus Pauling Institute the irritation about this medical breakthrough was noticeable. It did not go unnoticed that Linus Pauling was supporting these far-reaching conclusions. Yet, for the researchers and the leadership of the Linus Pauling Institute at that time, bold conclusions like the solution to the puzzle of cardiovascular disease were unheard of. I remember that some of the researchers from other groups wanted to join me in the quest to eradicate heart disease. They were held back by their colleagues, who stated that these publications were just too bold. "If you work with Dr. Rath you will ruin your career." Of course, today we know that none of that was true, and those who joined me in this quest to eradicate heart disease have the ride of their lives.

One of the most remarkable events surrounded the publication of our scientific papers in the *Proceedings of the National*

Academy of Sciences. This scientific journal is unique because it is a rather exclusive circle of authors who are allowed to publish there. Members of the Academy may contribute a certain number of papers each year. They themselves are the reviewers for publications to be submitted. There was an unspoken arrangement between Linus and me that I would write the papers and he would submit them for publication in this prestigious journal.

The first two publications were published without any major obstacles. The problems started with the third one. For this groundbreaking publication I had suggested the rather unpretentious title, "Solution to the puzzle of human cardiovascular disease: its primary cause is ascorbate deficiency leading to a deposition of lipoprotein(a) and fibrin/fibrinogen in the vascular wall." Linus Pauling submitted this publication to the Academy of Science. The editor in chief replied that he would publish it if we would agree to some minor changes. We did. However, suddenly the editor in chief of PNAS changed his mind. Against all rules of the academy, he decided to send the manuscript submitted by Linus Pauling to reviewers. They rejected the publication of this landmark paper with the argument: "Since there is no puzzle of cardiovascular disease, there can be no solution to this puzzle."

I remember talking with Linus about this open act of censorship. We agreed that we should not allow ourselves to be drawn on the chessboard of special interest groups and members of the Academy of Sciences who served those interests.

We decided to immediately publish this landmark publication in the *Journal of Orthomolecular Medicine*. I could not resist adding in the foreword the quotation from a letter from Kepler to Galilei: "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 ears, so do men close their eyes to the light of truth."

I also wrote a short introduction to this publication, essentially telling about the censorship at PNAS to everyone who would hold this historic publication in his/her hands. Never again should it be forgotten that there are interest groups so powerful that they can block publication of the truth. A truth that in this case was so important that it could have saved the lives of millions of people in the meantime.

I remember talking with Linus about this censorship, and said to him: "One day those people responsible for the rejection of this publication will be tracked down by scientific historians. I would not want to be in their shoes. They share the responsibility for unnecessary suffering and premature death of thousands, perhaps millions, of people." Linus agreed.

During all those months neither Linus nor I ever doubted that we were writing history. Our only question was how long it would take until the whole world would know and benefit from this medical breakthrough.

In the next chapter of this book I shall summarize the milestones of this process over the last ten years. In the subsequent chapter I shall focus on overcoming the obstacles placed in my way to accomplishing this global perception change in the area of natural health. These two chapters gave this book the title, "Ten Years That Changed Medicine Forever."