Dr. Dimitris Tsoukalas

How to Live 150 Years in Health

A USER'S MANUAL FOR THE HUMAN BODY

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To my first fan, my wife Yota, and
my two wonderful children, Rosa and Dennis

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Finally, I feel I owe an unbridgeable debt to all the brilliant and great minds who discovered and passed on that knowledge, thanks to which humanity can advance and improve, allowing all possible help to be given.

Foreword

"He who has health, has hope;

and he who has hope, has everything."

Thomas Carlyle

What is this book for

My father is a doctor, one of the best internists I have ever known. Early on in my career, he gave me some advice: "Try to give your patients a treatment that will heal them from the very first visit".

Many years later, I realised that this advice had put me on a path which was quite different from the one that sees medicine as a science, from the eighties onwards. It seemed that the intention was to diagnose and not to heal. To this day, doctors and patients still believe that diagnosis is an end in itself. Once the correct diagnosis has been made, the problem is considered solved.

The truth is that when the issue is an acute illness (which lasts less than 3 months) or a medical emergency such as pneumonia, a heart attack, a fracture or bleeding, making the right diagnosis leads to treatment and, in most cases, to a complete recovery. However, this is by no means the case for chronic illnesses (lasting longer than 3 months). For chronic illnesses, the diagnosis indicates the treatment, *but not necessarily a recovery*.

My ultimate goal was to heal my patients and the diagnosis was a stage in this process, not an end in itself. However, as I was then able to see, this was not something easily achieved and,

every time it did not happen, I felt I had failed in my purpose to heal. This prompted me to search for more effective cures and, in doing so, I was confronted with what I deem to be the biggest obstacle to modern scientists: an infinite amount of data!

We live in an era in which transmission speeds and information volumes are downright overwhelming. I strongly believe that our most pressing problem today as a society is not discovering and unearthing new data. Although there are still many things to discover, *the main problem concerns the evaluation of existing data*.

Not all data are equally valuable or true. Throughout 25 years of study and clinical practice, I have tried to evaluate and identify key data regarding health and the application of medicine. Once I found these data, assessing and sorting out the rest became a much easier endeavor.

Doctors and health professionals try to keep abreast of new developments to offer their patients the best care available, but it is not always easy to navigate in this sea of information and points of view. At times, even the best amongst them lose their way and drown in this rough sea of data.

This book is a summary of 25 years of research, study and clinical practice. The results obtained through this research and clinical application have allowed me to help thousands of patients and enabled them to improve their health.

Thanks to the team at the European Institute of Nutritional Medicine (www.einum.org), the methods I have developed have been codified and made available to health professionals and ordinary people, who seek their full potential for health and longevity through courses in Nutritional Medicine.

Improvements in health and the achievement of optimal well-being is within everyone's reach. Data in this book are what is needed in order to understand how our body functions and how to improve it. I sincerely hope you find it useful.

To your health!

Dr Dimitris Tsoukalas, MD

Chapter 1

Every subject, science or discipline is always based on one main datum more important than the rest, and to which all other associated information aligns, without exception.

In the first chapter, we shall cover the key datum regarding health.

What fact does indeed apply to all forms and methods of therapy, traditional medicine, homeopathy, and alternative, holistic and functional medicine, among other types?

Here lies the …

Secret of Medicine

Illness is the first and foremost concern and fear for many of us. If we fall ill, will we be able to fully recover?

How does medicine help the human body to heal upon illness?

What is the secret of medical science?

Answering these questions calls for the careful consideration of the qualities of life itself.

It has been observed that, as human beings, we have a natural tendency to seek joy and pleasure on both a physical and a spiritual level. Pleasure (or beatitude, as Plato described it) is such a powerful incentive that it can give us the strength to endure a lot of pain to attain it.

The pursuit of joy and pleasure, by definition, involves the effort of distancing oneself from pain and suffering. It is a trait that defines life itself and appears to be common to all living things.

These observations have been made over time by many philosophers and researchers, and allow us to understand, life itself and its governing laws in greater depth.

Pleasure is directly associated with good health, feeling full of energy and a sense of confidence and optimism to face life and the future. Today, however, this seems to be all the more difficult to attain. Is there hope to change a situation

that is gradually worsening on both an individual and a social level?

Life and natural laws

Here is a practical example to better understand the quality of life in relation to the physical universe. Let us suppose that your mobile phone slips out of your hands, falls onto the floor and breaks. What is the probability that, if you left it there on the ground for a period of time, it would repair itself and be restored to perfect working order? Do you think that putting it in plaster would help it to mend and return to normal?

In our experience, and according to the second principle of thermodynamics (a branch of physics that studies the properties of energy and matter in relation to heat), the probability of that happening is, quite simply, nil.

The second principle of thermodynamics states that the universe is experiencing constant deterioration of its state of order.

One of the most interesting scientific and philosophical debates of the past century is the one concerning the relationship between life and this same principle, and whether life defies or not this principle of physics.

Let us apply the same observation to the human body and suppose that, while hammering a nail into the wall, you hit your thumb by mistake. What would you expect to happen over the next month, in a situation such as this? You would normally expect the finger to heal and be perfectly all right

again. If this did not happen, you would be worried and, most probably, seek medical attention.

We take for granted that the human body can heal itself, while inorganic matter cannot. It seems that life has properties that go against the laws of physics.

Why, then, do living creatures head towards a higher state of organization, if only for limited periods?

The purpose of this dissertation is not to resolve this problem, which is certainly interesting from a scientific point of view, but to draw your attention to the fact that the human body has an intrinsic ability to heal itself and restore, when possible, a normal state of order.

No procedure, medical act, operation or form of surgery would work if this attribute of life, the capacity to organize matter and energy, even for limited periods, did not exist. In the case of the finger, if the doctor decides that it needs to be put in plaster, would it be the plaster that heals? Certainly not. The plaster simply allows the innate reparatory processes to proceed in the right direction.

As Voltaire said in the 18th century:

"The art of medicine consists of amusing the patient while nature cures the disease."

Hippocrates described the same thing in a different way:

"First, do no harm"

According to Hippocrates, in order to cure an illness, the doctor should, above all, not cause damage. The capacity for

self-healing is considered a certainty and all the doctor needs to do is more good than damage to cure the illness.

This constitutes one of the founding principles of modern medical ethics, and the key principle of emergency medicine throughout the world.

Our body has a tendency for health

As mentioned above, the human body has an innate tendency to be healthy. It does not tend to just fall ill like many of us believe. Each one of our cells endures 10,000 lesions every day. Specific anti-oxidizing mechanisms are activated to correct most of these lesions.

There are thus only two reasons for illness:

1) When the damage caused by act or by omission exceeds the ability and speed of the body to repair itself.
2) When the substances required for repair are not available. The body repairs damage as long as it has the substances available, and generally this occurs without us even noticing. The problem arises when the body's resources gradually run out and the repairing process remains incomplete. The accumulated damage manifests itself as an illness.

It is our choice to either continue to add to these lesions with an inappropriate diet, smoking, excessive

consumption of alcohol, use of drugs, and abuse of medicines, or to keep the repair mechanisms in good condition by eating fresh, wholesome food, drinking plenty of water, taking exercise and meeting the needs of our body with the nutrients required to ensure health rather than illness.

The book that you are holding in your hands unveils how you can help your body attain the condition to which it is naturally inclined: health. We are perfectly able to do this because nature wants us to be healthy. It takes a constant and persistent effort to make ourselves ill.

For more information and references visit:
www.einum.org/150years

Chapter 2

Both the public and scientists of today are completely overwhelmed by the enormity of data regarding health, medicine and other related fields. Books, diets, treatments and diagnostic methods of all kinds, often contradictory to each other, propagate their position and the errors of others.

Is it possible to evaluate and unify data according to a common, simple logic, so that anyone can understand and use them?

It took me almost thirty years of study and clinical research. I think though I have overcome an obstacle that seemed insurmountable. I am happy to share my experience now.

The four levels of medicine

New data emerges quickly from medical research and life sciences. The problem for today's scientists is no longer a lack of data but rather how to use and evaluate the multitude thereof. This is evident as different schools of thought evaluate similar data in completely different ways.

Addressing identical health issues in different ways confuses patients and, sometimes, even doctors themselves. Which therapy or method is best for solving a health problem? Conventional medicine, alternative medicine, homeopathy, natural medicine, acupuncture, metabolomics[1] and nutritional medicine are just some of the different existing schools of thought.

Is it possible to find common ground?

Scientific knowledge and objective observation

By definition, science is objective observation and the reporting of these observations without changing them. However, as in any other human activity, excluding subjective influence proves nearly impossible. It is therefore inevitable that the personal beliefs and opinions

[1] *Metabolomics: a new science that studies the products of chemical reactions that occur in a living organism. These products are called metabolites and their examination as a whole provides a comprehensive picture of the functioning of the body.*

of scientists find their way into observations and scientific conclusions.

There are many similar examples in the history of medicine, such as that of William Harvey, who discovered the cardiovascular system in 1628. Harvey was first to announce that the heart functioned as a pump, pushing blood through the body. Up until then, the prevailing blood circulation theory was Galen's, who believed that good and bad body fluids circulated in the body in waves. Thus, bad fluids were dark (we now know that referred to venous blood), while good ones were bright red (arterial blood). Following this theory, bloodletting was practiced to expel bad fluids and "favor" healing.

As usual, whenever human thought and knowledge make an important breakthrough, harsh criticism ensues. Even Harvey's ideas, the physician of the King of England, were despised at the time. What is more, a famous physician of his time declared that he preferred being wrong a thousand times with Galen, rather than being right with Harvey.

Not surprisingly, the loss of large amounts of blood through bloodletting was a common cause of death at the time. Almost two hundred years after Harvey's discoveries, "new" data on blood circulation was not yet fully understood and incorporated into medical practice. In 1799, the first U.S. president, George Washington, died because of the bloodletting "therapy" prescribed in good faith by one of the best physicians of the time and his personal friend, Dr. James Craik.

It is inevitable that scientists, just as everyone else, become enamored of their work, the discoveries and data they have consistently relied upon throughout their lives.

"A minimum of three generations is required for a change in the prevailing scientific model to be accepted"

The story of science shows that a minimum of three generations is required for a change in the prevailing scientific model to be accepted.

These days, however, we are experiencing something unprecedented in human history: the information age. The speed of exchange and generation of information are, to say the least, astounding. It is estimated that it took 300 years to double the human knowledge written from 1450 to 1750 AD. Today, written human knowledge doubles every year and, by 2020, the expectation is that it will do so every 72 days!

Nowadays, we can see the rise and fall of a theory within a single generation. A famous example is that of cholesterol. We have scientifically shifted from the hydraulic model of cholesterol, which assumes that poor quality fluid (i.e., blood with high levels of cholesterol) clogs the pipes through which it circulates (blood vessels), to a model that considers artery wall inflammation as the cause of arteriosclerosis (Harvard Medical School, 2011).

Where is modern medical science today? From a diagnostic and therapeutic standpoint, medicine can approach the human body at four different levels. Each level involves a different way of thinking and is effective for specific health issues.

I. Anatomic level

The first level concerns the anatomic or mechanical approach, which adopts a macroscopic view and thus sees the human body as a set of organs – not unlike a car engine. This model and school of thought dominated medical thinking until 1950 and explains why medical specialties, to this day, are defined by the organs they deal with. Cardio-logy ("cardio" is Greek for 'heart' and "logos" means 'study of'), gastro-entero-logy ("gastro" stands for 'stomach' and "entero" for 'intestine'), derma-tology ("dermis" stands for 'skin'), nephrology ("nephron" stands for 'kidney') and so on. The anatomic approach demonstrates unparalleled efficacy in the management and treatment of acute illnesses and emergencies. The fracture of a bone, the rupture or blockage of a blood vessel, pneumonia or the perforation of an organ require immediate intervention to restore anatomic continuity and functioning. This approach has proven its unquestionable effectiveness on acute illnesses over the last sixty years.

"The anatomic level demonstrates unparalleled efficacy in the treatment of acute illnesses and emergencies albeit its effectiveness in treating chronic health issues is limited"

The effectiveness of this approach for chronic health issues is however limited. If we hurt our knee, for example, applying some ice, immobilizing the joint and using anti-inflammatories may accelerate healing, reduce pain and inflammation. However, the use of this type of treatment in

cases of pain due to osteoarthritis (chronic arthritis) provides some temporary comfort albeit lacks any therapeutic value. In such situation, arthritis will continue to worsen because the real causes of illness are not addressed and, furthermore, side effects might arise from the chronic use of painkillers.

Chronic health problems could be better explained after the discoveries made by the middle of the last century. After the '60s, widespread use of the electron microscope greatly increased the understanding of the human body at the cellular and molecular level, marking the entry into the era of biochemical medicine, genetics and molecular biology.

II. Biochemical-molecular level (Metabolomics)

The second level concerns the body's biochemical balance. The body is an internal combustion engine that burns carbon (contained in glucose) in the presence of oxygen. To that end, a multitude of substances is needed while different chemical reaction chains gradually lead to the production of energy and normal cellular function.

"Metabolomics is the science that measures the products of chemical reactions that occur in the human body and provides powerful insights into the functioning of the human body"

The modern environment and the progressive abandonment of natural lifestyles, coupled with nutrient

deficiencies and the toxic burden, adversely affect biochemical balance and favor illness incidence.

Further to treating any symptoms, it is now possible to measure and evaluate the metabolic and biochemical state of the human body through the following analyses:

- Hormonal;
- Biochemical;
- Metabolomic.

Metabolomics is the science of measuring the products of chemical reactions (metabolites) that occur in living organisms.

These analyses and, in particular, metabolomic analyses provide a complete picture of the biochemical state of the human body. This method of analysis is currently the most reliable method for determining a person's health condition. Individual metabolomic profiles allow the effective introduction of Nutritional Medicine and the creation of personalized therapies to restore biochemical balance.

Thanks to technological developments, we can use the “Secret of Medicine” in a very specific manner, allowing nature to complete its therapeutic work without interruption (which is not the case with the introduction of substances that are extraneous to the biochemical structure of the body), while administering the precise substances (nutrients) needed to achieve an optimal health condition.

III. Electromagnetic level

The third level relies upon the human body's electromagnetic field. As you possibly recall, theory states that a flow of ions creates a magnetic field. As the body is traversed by streams of charged molecules inside and outside its cells, magnetic fields abound and ultimately create the body's magnetic field.

MRI scans aptly leverage the properties of electromagnetic fields. In essence, MRIs align the body's magnetic fields in the same direction -using powerful ring-shaped magnets- and capture an image to facilitate subsequent anatomical diagnosis.

Electroencephalograms and electrocardiograms are also applications based on changes to the electromagnetic field of the brain and heart.

"Electromagnetic changes alter biochemical efficiency and, consequently, anatomic functioning"

The study of the human body's electromagnetic fields has been the subject of extensive scientific research for over 100 years. Both NASA and the Russian space program have contributed significantly to the development of this field of scientific research. On the other hand, the explosive growth in computer science has allowed the diagnostic and therapeutic application of electromagnetic frequencies. I believe that the time will soon come when a MRI scanner-like device will be able to identify and, at the same time,

correct distortions in the body's electromagnetic field for therapeutic purposes.

This is most likely also the level at which homeopathy operates. Homeopathic solutions, after a series of dilutions, do not contain any chemical traces of the original substance. There is evidence, however, that the electromagnetic footprint of the substance stays in the solution.

The modern environment, buildings, food itself, which is sometimes irradiated, and all kinds of electronic devices, electric and electronic networks, continuously interfere with the human body's electromagnetic field. *An alteration at electromagnetic level affects biochemical efficiency and, consequently, anatomic functioning.*

IV. Thought: the sovereign level

The principle of Anaxagoras, which states that "mind is the prime cause", is as relevant as ever. Modern quantum physics and epigenetics prove that this statement is true by using irrefutable scientific criteria. Nowadays, quantum physics tells us that it is the observer who models what happens in a system and not the opposite, as previously postulated by Newtonian physics.

Until a few years ago, it was hoped DNA coding would allow us to understand, prevent and regulate the behavior of an organism, and even our own health. We now know that genetic predisposition is generally responsible for 25% of the current health condition of an organism, and external influences on the expression of genes are responsible for

75% of the final result. This is the topic of epi-genetic (from the Greek “epi”, ‘above’ genetics) study.

According to biologist Bruce Lipton, the mind controls gene expression and the only limitation is that posed by our thinking. The research that Lipton carried out at Stanford University from 1987 was the prelude to modern epigenetics. Lipton defined in two major scientific publications the biological pathways that connect mind and body at a molecular level.

Thought is to our body what software (programming) is to a computer. The only difference is that, while a computer needs an external operator to install a given program, the human mind is capable of original thought. Discoveries, works of art, philosophies, cultures and entire civilizations have all emerged from a single original thought.

However, our thoughts do not end up as isolated ideas in our minds. In fact, every thought we have causes an emotional reaction. In turn, emotions cause a release of hormones and regulate bodily functions through the cerebral cortex - hypothalamus - pituitary axis, which are the hormonal system’s control centers.

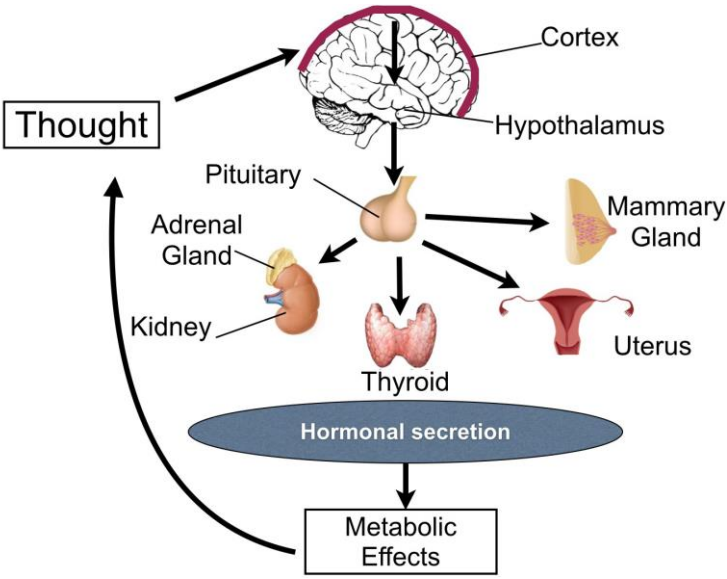

Figure 1/2 Diagram depicting the connection between thoughts, organs and metabolism.

In this manner, thoughts and emotions affect the various functions of our body at the anatomical, biochemical and electromagnetic level.

In other words, a thought leads to an emotion and this, in turn, causes a specific hormonal secretion for that emotional state. If you think back to a situation in which you felt embarrassed, doing so may make you re-experience the feeling of shame, which in turn might lead to blushing. Different emotions such as fear, joy, boredom and sadness cause specific hormonal secretions.

In today's world, where the main feelings are those of uncertainty for the future, fear for ourselves and our loved ones, our health is under constant attack. Mental stress is converted into biological stress, which disturbs the

metabolic and hormonal balance and is often the trigger or cause of illness.

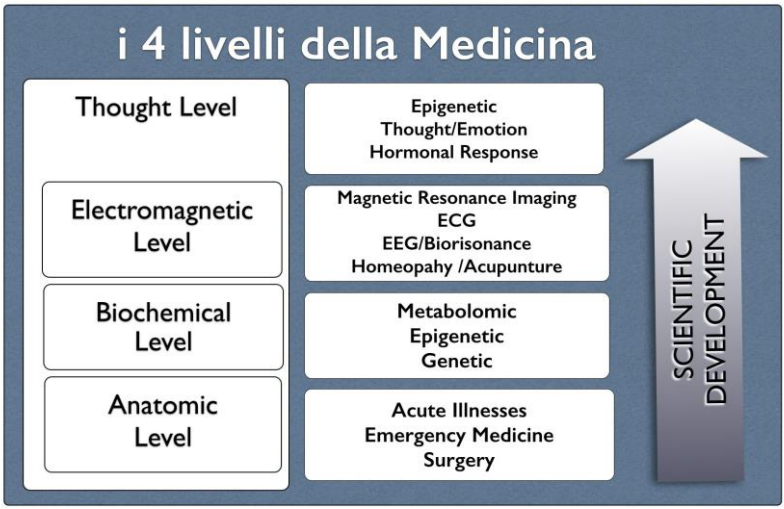

Figure 2/2 A diagrammatic representation of the four levels of medicine.

In summary, medical science can address our health on four levels:

- Anatomical;
- Biochemical-molecular;
- Electromagnetic;
- Thought.

This information can be used as a tool to evaluate and unify various data regarding diagnostic and therapeutic approaches. Medical science encompasses a set of different knowledge fields with a single purpose: Keeping people healthy. This goal can be achieved using all scientific instruments at our disposal, each where it is most effective.

Nowadays, we live in a particularly difficult time for economic, social, humanitarian, ethical and environmental reasons. Surprisingly enough, we are though able to do more for our health than at any other time in human history.

For more information and references visit:
www.einum.org/150years

Chapter 3

In the first chapter, we saw that being healthy is an achievable goal because the human body is genetically programmed to be healthy.
In the second chapter, we described the means whereby we can achieve good health.
In the third chapter, we will see how far we can push our health.

What will be our life expectancy in the 21st century?

Do we have the means to significantly increase our longevity? According to some scientists, the longest a human being can live is 125 years. We know that the person who lived the longest in the modern era was Jeanne Calment, a French woman who reached the age of 122, in 1997.

New findings, however, allow imagining that the average length of human life will exceed two hundred years. To many this appears difficult, not to say impossible. Several scientific groups around the world are working nonetheless towards achieving this goal.

Two thoughts usually spring to mind after this sort of statement is uttered:

- Is it worth it?
- Is it really a desirable goal?

I continue to be amazed every time I mention this topic. The first reaction to my claim: “science is very close to being able to extend human life to over two hundred years” is pleasant surprise, quickly and invariably followed by these three problems from my audience:

- I will be very old and alone, which is something I would rather avoid;
- How will the planet manage to support all these people?
- Insurance companies will go out of business if everyone were to live for so long.

For one thing, I simply could not care less about the fate of insurance companies, even though I am quite certain they will find a way to earn even more money.

More importantly, there is Earth's problem. However, we can rule this out as a problem on several grounds. Truth is that, the larger the planet's population, the more resources are created. Man, in fact, operates as consumer and producer at the same time. What is more, according to demographic research, while the number of people is increasing in absolute terms, the rate at which this growth occurs is decreasing. If this trend continues, twenty-five years from now the population of earth will peak, then start to decrease gradually and, in seventy-five years' time, it will be back to seven billion, the same level as in 2011.

Last but not least, the problem of old age, which I absolutely acknowledge. Indeed, the first prerequisite for any research in this field should include the extension of the duration of life coupled with a young and healthy body.

Where are we now?

Between 1810 and 2010, humankind was able to double the average life span for most of the population on this planet. From a life expectancy of forty years, we have now

reached eighty. Over the last two hundred years, we have doubled the average life span of the majority of the planet's population, a life span which had been established for thousands of years. Most of this improvement occurred during the last century. Average life expectancy at the beginning of the last century was 47 years. If we had told a person in the early nineteen hundreds that the average life expectancy would almost double within the next hundred years, his/her reaction would be akin to that we encounter today upon this bold statement: before long, men will live over two hundred years.

At this point, it is key to understand how humanity has managed to achieve continuous improvements in this field, so that we are able to strengthen the actions that have contributed to extending our life span. To most people, these improvements arise from the advancement of medical science and the amount of food available. Let us understand whether that is indeed the case.

Every twenty years, humanity manages to exceed the upper limit of survival set by scholars, who then arbitrarily set a new limit. This might not appeal to insurers, who need to change their coefficients constantly, but even in the face of global problems (economic crises, environmental pollution, wars, hunger and climate change), humankind continues to extend its life expectancy.

A large part of this endeavor is usually attributed to medicine and the new drugs discovered during the last century. Nothing further from the truth. According to epidemiological studies, medicine has helped to reduce mortality from acute illness and emergencies. While it is true that lives are saved thanks to this approach, it is no

less certain that its contribution to the overall life span growth does not exceed 5%.

Modern medicine provides a significant contribution to the reduction of perinatal mortality (the period before birth until a month afterwards) and also in improving the quality of life during illness. Great technological steps in modern medicine have allowed us to treat pain and other unpleasant sensations and manifestations of various diseases (fever, shortness of breath, dizziness, itching, etc.) very effectively, but according to epidemiological studies on the matter, its impact on increasing the average life span does not exceed 5%.

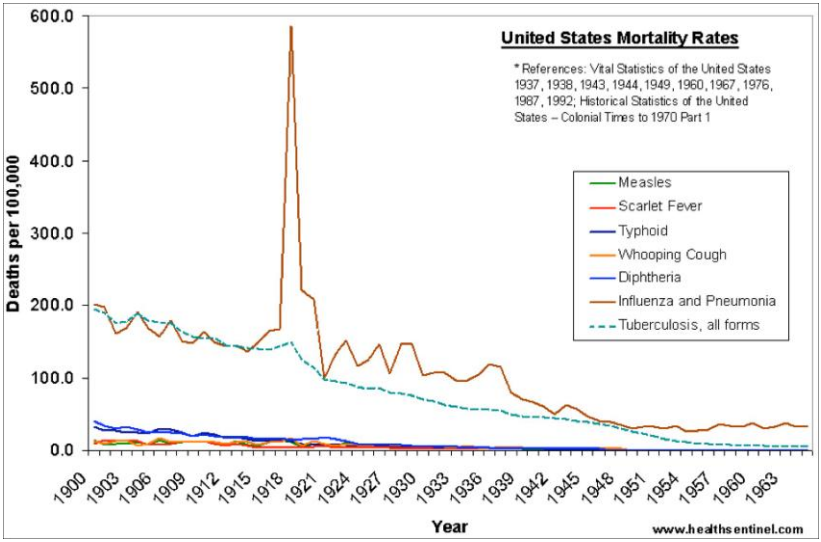

Figure 1/3 Trend in the mortality rate caused by infectious diseases. Note that most preventive vaccinations were introduced after 1950, when the mortality rate had already dropped sharply.

A second, most notable aspect, is the relationship between life expectancy and vaccination. It is commonly believed

that much of the reduction in the rate of mortality is due to vaccines, which have enabled us to fight infectious diseases such as tuberculosis. Numbers, however, suggest otherwise. The diagram in Figure 3-1 shows the trend in the mortality rate due to infectious diseases since the beginning of the last century up until 1965 in the USA.

Most preventive vaccinations were introduced after 1950. As evidenced by the diagram, the downward trend of deaths due to tuberculosis shows no real change (the dotted line represents tuberculosis) despite the introduction of vaccines shortly after the Second World War. Similar trends are also seen for other infectious diseases (typhoid, diphtheria, measles, scarlet fever and whooping cough). The peak of mortality was reached during the flu epidemic of 1918.

According to epidemiological studies and statistics, the main factors that contributed a full 95% to the increase in average life expectancy were:

- Improvements in public health, such as water supply and sanitation;
- Improvements in living conditions, such as better housing and public buildings;
- Public education on the aspects of hygiene;
- Improvements in sanitary conditions regarding food storage and transportation.

All of this is most certainly due to scientific and medical breakthroughs, which have helped to significantly improve our living conditions and understanding of the factors underlying infectious diseases. It is nevertheless necessary

to distinguish between hygiene-social practices and medical therapeutic practices. A recent editorial article with the title "less is more" in *Archives of Internal Medicine*, the prestigious medical journal, reported that available data suggests that the less health care services, both regarding diagnosis and treatment, the better health results for the general population.

From the above, it seems clear that hygiene was the main factor in increasing the average life expectancy during the past two hundred years.

What are our limits as a species?

Every species seems to have a maximum longevity. What might be the maximum life span for the human species?

The upper limit of human life was determined during the '80s at around one hundred years, in the nineties this was revised to a hundred and ten and, in 1997, Jeanne Calment lived to one hundred and twenty-two. If you exclude the genetic factor that, as we have already seen, has less than a 25% influence on determining our health condition, what can we do to live longer and better?

Over the last hundred years, the average life span has virtually doubled, primarily due to changes in the level of hygiene, while at the same time there has been a deterioration in diet, in the environment, a decrease in physical activity and an increase in mental stress. This mixed picture seems to indicate that the improvement potential is still very ample.

Even if only one of us reaches one hundred and twenty-two years of age, this means that our bodies, as a species, meet the genetic requirements to do so. According to laboratory experiments and calculations based on the longevity of individual cells after successive subdivisions, the limit of the human species' life span is estimated at 140-170 years.

Using a different approach and considering the research carried out by geneticists from the Harvard Medical School, it was established that maximum longevity among mammals is uniformly related to the time that a species needs to reach physical sexual maturity. The longer it takes a species to mature physically, the greater its longevity. In particular, the ratio between maximum longevity and the number of years needed to reach the required physical sexual maturity is 12.8.

In humankind, sexual maturity is reached between 12-18 years of age and this, in line with other mammals, should result in a maximum longevity for the human species of 150-230 years. Therefore, it seems that these two different research methods can confirm that one hundred and fifty years is a realistically achievable goal for the human body's life span.

Living longer is not enough

As already mentioned, living longer is not a goal in itself. A truly desirable goal would be to live longer in perfect physical health. Right now, researchers in many centers around the world are exploring different avenues so that

humankind may lead a longer and healthier life. The most promising research involves:

- Elongation of telomeres. These are the final part of chromosomes. The longer the telomeres are, the less chance there is of falling ill and the longer the life expectancy becomes;
- Decrease in insulin receptor[2] activity and correlated growth factors. [IGF-1 , insulin / insulin-like growth factor signaling (IIS)];
- Proteasome activity: a mechanism found inside cells, which disintegrates proteins that are of no use to cellular metabolism. Malfunctioning proteasome leads to early cell death;
- Sirtuins (Sir2), are substances that enhance DNA repair and extend the longevity of cells;
- TOR (target of rapamycin), which refers to a receptor that plays an important role in aging mechanisms and has been used experimentally to increase the life span of laboratory mice.

It seems that much of this research is very close to workable solutions, as in the case of telomeres: research that received the Nobel Prize for Medicine in 2009. Later on, we will discuss this mechanism in greater depth, together with the telomerase enzyme, which is able to lengthen telomeres in a completely natural way and,

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[2] *Receptor: a structure capable of responding to stimuli or specific substances, developing a typical reaction.*

according to prominent researchers in the field, even our very lives.

Telomerase is also called the enzyme of immortality, because when activated, it could lead our cells and the entire organism to a state of biological age below the chronological one. Not long ago, I visited the world's most advanced research center on telomeres. In a discussion I had with Dr Bill Andrews (the scientist who discovered the telomerase enzyme), he told me that he believes it to be the most important discovery that has ever hit our planet. To these researchers, the goal of living two hundred years seems a mere step away.

Some natural telomerase activators have already been in use for a few years and there are also the first scientific studies published on the subject. They show improvements that affect the immune system, the skin, sight (an improvement of presbyopia) and sexual activity.

Over the next fifteen years, we will almost certainly see dramatic developments in this field. Our obligation is to remain in the best possible health condition until the introduction of large-scale solutions aimed at reversing the biological clock.

For more information and references visit:
www.einum.org/150years

Chapter 4

"Let food be your medicine and medicine be your food". Hippocrates 400 BC

How can modern man starve while eating more?

It was necessary for biotechnology to reach its current high-tech status, capable thus of analyzing the biochemical, cellular and genetic functions of the human body, to understand what Hippocrates discovered by simple clinical observation 2,500 years ago.

How can modern man starve while eating more? In the present day, food is as plentiful and available as ever in the history of humankind. We are, however, effectively starving. I am not referring to third world countries but to the rich and industrialized countries. The population shows nutritional deficiencies of many nutrients and a large part thereof presents undernourishment symptoms. How is that possible?

To better understand how such a thing came about, it is necessary to consider the two main reasons for eating, pleasure aside:

- to take up energy, hence calories;
- to take up nutrients.

Simply put, calories represent the amount of energy contained in food. Nutrients are vitamins, minerals, proteins, carbohydrates and other elements necessary for the execution of cellular processes and tissue reconstruction.

The body needs both calories and nutrients. Until a few decades ago and since the beginning of its presence on our planet, man has always lived in an environment where food was scarce. Research on longevity and metabolism of the human body, has unequivocally shown that *our body works best with foods that have low caloric output yet high nutritional value.*

Nowadays, exactly the opposite prevails. Most of the foods we eat provide large amount of calories with low nutritional value. Even with our high calories intake, we are in effect starved of nutrients.

A dangerous exchange

The exchange of nutrient intake for caloric intake is the leading cause of chronic diseases in the modern era. The World Health Organization (WHO), in its report on Nutrition and the Prevention of Chronic Diseases, states that 60% of global mortality is attributed to chronic diseases related to nutritional deficiencies. What is most worrisome, according to the WHO, is that this type of diseases, like heart disease, obesity and diabetes plague large parts of the population at an increasingly youthful age.

This change, which took place gradually over the last forty years, has now reached the point where most of our food is of scarce nutritional value. It is obvious that a human body, in order to a function and stay alive, requires vital substances such as *oxygen, water, micronutrients (vitamins, minerals, amino acids) and macronutrients (fats,*

carbohydrates, proteins). If one or more of these elements is absent or not available in sufficient quantity, the biochemical balance is seriously altered and our health compromised.

You would never consider using sand in your car instead of gasoline, stop the air supply or start the engine without oil, would you? It would be downright absurd.

Accordingly, how can we expect to remain healthy and vibrant when:

- 70% of the population experiences a significant degree of dehydration;
- Oxygen levels in the atmosphere of modern cities are reduced by up to 35%;
- Food is up to ten times poorer in nutrients as it was fifty years ago;
- The calorie intake has steadily increased over the last forty years.

One requires ten servings of vegetables to receive the nutrients available in a single one fifty years ago.

The vast majority of people believe that a balanced diet provides all elements necessary to remain healthy. Therefore, a varied, well-balanced diet seems the most appropriate approach. This was indeed a valid assumption fifty or a hundred years ago. Today, an average diet fails to provide the minimum recommended daily amount of nutrients, at least the amount required to repair and regenerate tissues.

The products we buy from our local supermarket lack the nutrients that fruits and vegetables had a few decades ago. Intensive cultivation, soil depletion, the use of industrial fertilizers, hybrid crops and genetic modifications have reduced the nutritional value of fruits and vegetables. Accordingly, we must eat ten servings of spinach to take in the same amount of minerals available in a single one fifty years ago.

Can you remember what the flavor of tomatoes was when you were a child? Would you say the today's tomatoes taste the same? Do they have the same smell, taste and appearance? Give it some thought and you will realize these are completely different products (this obviously applies to those over the age of forty). The same happens with bread, meat, vegetables and other foods.

Fruits and vegetables absorb minerals and the rest of nutrients from the soil. Animals and humans eat them and in turn absorb the ingredients contained therein to survive. Higher forms of life rely on those found further down the food chain to obtain items and nutrients.

Minerals are absolutely essential for life. Each gland in our body needs certain minerals to function properly. The thyroid gland and ovaries need iodine, the pancreas need chromium, the prostate needs zinc, adrenals need potassium and so on. Minerals are essential catalysts for the use of vitamins and for the activation of many enzymes. You could trace a connection between the cause of each disease and a missing mineral element. Magnesium for example, is involved in over 300 intracellular functions, a worrisome fact given that the majority of the world population suffers from significant magnesium deficiency.

Minerals in their inorganic form, as found in the soil, can be absorbed by humans only in minimal amounts (8%). Conversely, minerals processed by plants and converted into their organic form can be absorbed at 100%!

The Earth is no longer the same

According to data of the World Summit for Earth in 1992 in Rio de Janeiro, soil impoverishment has dramatically worsened over the last fifty years.

Soils with the highest rate of depletion of minerals are:

United States and Canada (85% depletion);

South America (76% depletion);

Asia (76% depletion);

Europe (72% depletion);

Australia (55% depletion);

Surprising? Well, these figures represent the soil condition more than twenty years ago. During the last World Summit for Earth in 2012, the situation described was even worse. A recent report by the Department of Agriculture of the United States, confirms the significant decrease in the nutritional value of fruits and vegetables, from 1975 up to today:

- Apples, loss of vitamin A by 41%;
- Fruit, loss of vitamin C by 31%;
- Watercress, loss of iron by 88%;
- Broccoli, loss of calcium and vitamin D by 50%;

- Cauliflower, loss of vitamin C by 45%, vitamin B1 by 48% and vitamin B2 by 47%;
- Green salad, loss of vitamin A by 45%, potassium by 60% and magnesium by 85%;

In less than fifty years, the nutritional value of fruits and vegetables in terms of vitamins, minerals and antioxidants has decreased significantly.

Nutritional deficiencies and chronic diseases

Chronic diseases, which until a few decades ago were rare, now have become commonplace. How many people you knew twenty years ago suffered from multiple sclerosis, rheumatoid arthritis, diabetes, obesity, lupus or celiac disease? Today, unfortunately, the chance to meet someone suffering from these diseases is very high.

According to B. Ames and J.M. Mc Ginnis, public health experts, deficiencies in micronutrients due to a diet high in calories and low nutritional value, accelerate the incidence of chronic diseases, aging and cancer. The same authors state that it becomes increasingly difficult to obtain adequate amounts of micronutrients necessary for a good health without dietary supplements.

The vast majority of the food we eat today is really "empty" and fails to provide our body with the substances needed to perform the chemical reactions underlying its survival and healthy functioning.

Flavor enhancers and deterioration of our health

The foregoing is further complicated by the addition of chemical flavor enhancers to food. The taste of flavor enhancers creates an addiction to synthetic flavors and makes unprocessed, natural foods bland by comparison.

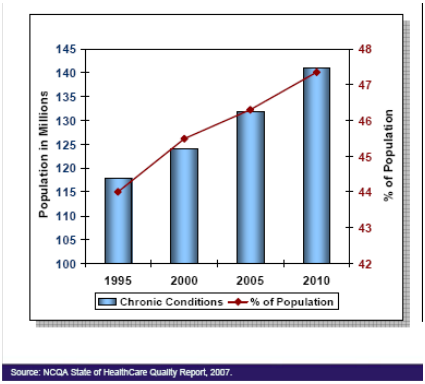

Figure 1/4 (Evolution over time of chronic diseases incidence in the USA).

The more you consume artificially processed foods and beverages, the harder it becomes to consume natural products. The abandonment of a natural diet leads to increasingly worse habits; lack of energy makes us more forgiving to a primarily sedentary lifestyle, and thus begins a decline of our health that proves very hard to reverse.

Correcting the nutrient deficit is vital to that end. An increasing number of studies link chronic diseases to deficiencies of essential nutrients and to the burden of toxic substances:

- Multiple sclerosis: vitamin D, heavy metals, essential amino acids;
- Rheumatoid arthritis: Vitamin D;

- Asthma: dehydration, magnesium, minerals;
- Autism: heavy metals, vitamin D, vitamin B6, magnesium, altered intestinal flora;
- Diabetes: Vitamin D, magnesium, chromium;
- Thyroid diseases: selenium, chromium;
- Breast cancer: Vitamin D, calcium;
- Colon cancer: altered intestinal flora, vitamin D;
- Colitis and inflammatory bowel disease: altered intestinal flora;
- Stomatitis: Vitamin B12;
- Alzheimer's disease: Vitamin B12, magnesium.

The ideal solution is to locate the deficits and correct them. We live in an age where technological developments have caused dramatic and violent changes to the planet. Technology, however, can be the answer to the problems it created. Through technological advances occurred during the last ten years, we are able to measure and evaluate the function of metabolic pathways in the human body in real-time and produce supplements to restore the body's biochemical balance.

Food taken in by the human body is assimilated and transformed into energy. All of these reactions are called *metabolism* and the product of a metabolic reaction is called *metabolite.*

Through the measurement of the metabolites in the human body, we can identify reactions with sub-optimal performance. In doing so, we uncover the needs or deficiencies determining the health of any person. This type

of analysis is the most reliable method to assess a person's health condition and is part of a new science: Metabolomics. Metabolomic analysis, very much like a map, allows creating a nutrition and supplement intake regimen to restore the body to its optimal health condition.

For more information and references visit:
www.einum.org/150years

Chapter 5

From what we have examined so far, it seems that medicine is no longer the same it was just twenty years ago. At the same time, a biological science has developed to completely change the way prevention, diagnosis and treatment works.

Metabolomics, the science that is Changing Medicine

Our body is a complicated laboratory where millions of chemical reactions occur. Thousands of substances react with each other, merge to form new substances or divide and decompose in their constituent parts.

The array of these chemical reactions is called metabolism, from the Greek *"metabole"*, which means transformation or change. Usually, one identifies the word metabolism with bowel function, calories burned and weight loss.

The main purpose of metabolism is to transform the various substances so that they are used in two main directions. The first is *structural and regenerative*, while the second concerns the *production of energy*. These two mechanisms, structural and energy, are the basis of life in biological organisms. Metabolism is essentially made of all processes supporting life. Imagine an organism that can build and remodel its cells, tissues and organs with *ease* while sufficient energy is available. This is the description of a healthy body.

Any blocking or non-ideal performance of these processes would take the body closer to dis-*ease*, eventually suffering from it. If we look at the etymology of the word *"disease",* it comes from *"lack of ease"* which literally means presence of difficulty or effort.

In fact, the human body is an internal combustion engine that burns carbon, i.e. food, when oxygen is available. For this to happen at peak efficiency, the body should be provided with all nutrients required. A car needs fuel, filters, oil, water, valves, catalytic converters, air, spark plugs, etc. Similarly albeit in a much more complex manner, living organisms, through the chemical transformation (metabolism) of substances introduced with the intake of food and air, operate perfectly or otherwise depending on the availability of materials required by the "manufacturing company".

Let us imagine you own a Ferrari. If, instead of using the correct petrol and driving it on the highway, we fill it with diesel and use it for off-road driving, it will soon break down and malfunction. However, it is also possible to buy a new car that presents defects from the outset. For example, manufacturing was not as smooth as expected hence the unit malfunctioned due to faulty fabrication.

Living organisms can also malfunction (i.e. experience diseases) due to either incorrect use and/or diseases suffered since birth. This is known as acquired diseases or congenital diseases.

Since the 1940s, researchers have strived to study metabolic pathways to identify the cause of disease. It was then that we began to measure and study the result of metabolic reactions, i.e. metabolites. This discipline, which deals with the measurement and study of metabolites, was called Metabolomics.

The human body contains about 5,000 different metabolites. From the 40s to date, technological developments have allowed us to measure and identify all

individual metabolites in the human body. The measurement of different metabolites helps us determine the exact points where biochemical failures occur and, therefore, the origin of a metabolic disease.

Metabolomics has diagnostic and therapeutic applications:

- In autoimmune diseases;
- In diseases of the digestive system;
- In oncology;
- In diabetes;
- In autism;
- In neurological diseases;
- In obesity;
- In cardiology.

Finding the real root cause of all chronic diseases paves the way for therapeutic intervention.

At the beginning of the past century, Thomas Edison made the following prophecy:

"The doctor of the future will give no medicine, but will interest her or his patients in the care of the human frame, in a proper diet, and in the cause and prevention of disease".

Thanks to rapid developments in technology occurred during the last twenty years, the prophecy of Edison can be considered fulfilled. The root cause of a disease is not the lack of drugs. You do not fall ill because your body lacks aspirin!

Under the assumption of being born healthy, you fall ill because one or more metabolic pathways are not functioning properly due to insufficient nutrients, or because some toxic element, foreign to human metabolism, blocks the development of vital reactions.

It is so simple and obvious that it is largely ignored by applied medicine. By its nature, science tends to complicate things. Science is oriented to discover and assemble further details about things we already know. As you discover the actual piece of information explaining and aligning disperse data, things appear so simple that your knee-jerk reaction tends to be: "too easy to be true". Humanity takes some time to widely understand and incorporate new perspectives.

As doctors, in particular, we are trained to handle diseases and keep symptoms at bay. Sure, it is a desirable thing and

must be done where necessary. It provides excellent results with acute illnesses. Rebuilding a healthy condition, however, demands acting in the direction of health. During the 20th century, medicine conquered acute illnesses. With the developments of Metabolomics, medicine expands its field of action to attain health itself.

After twenty or more years in clinical medicine, the results obtained with this approach still amaze me each passing day. By its very nature, the human body tends to health; it suffices to act in a supporting manner, without causing any damage, to attain a healthy condition. This does not occur just magically; we must act in multiple directions, lifestyle change, nutrition, and spend some time for our own health. In short, those truly seeking a healthy condition now have the right tools to be successful. We tend to consider this as a challenging undertaking. However, changing habits, watching your diet, taking vitamins and doing a little bit of exercise is no major endeavor. When acting in line with our physiology, it is easy, engaging and extremely rewarding.

For more information and references visit:
www.einum.org/150years

Chapter 6

In modern medicine, there is an assumption that plays the same role that fate did in ancient times. We refer to the hereditary factor. "You cannot escape your genetic make-up".

Now, however, genetics - the science of genes - seems to thinks otherwise. Thus, it has begun …

The end of the Genetics era

DNA is found in the nucleus of every cell of the body and is essentially an information pool. It is composed of genes placed in series one after the other and forming a long chain, i.e. the genetic code. Twenty-one thousand genes contain information for the creation and operation of the human body.

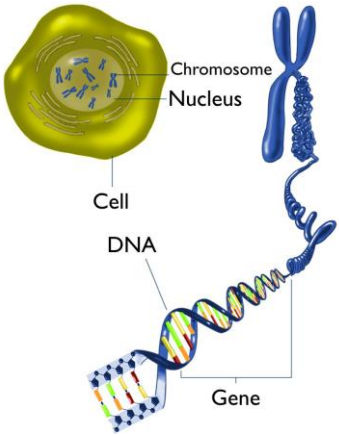

Figure 1/6 Schematized cell and genetic heritage

In recent years, progress in biomedical research and genetic engineering has created great expectations for the transfer of these discoveries into medical practice. Within a few decades, we have discovered part of the inner workings of DNA, completed the map of the human genome, and diseases have been associated to the precise alteration of certain genes.

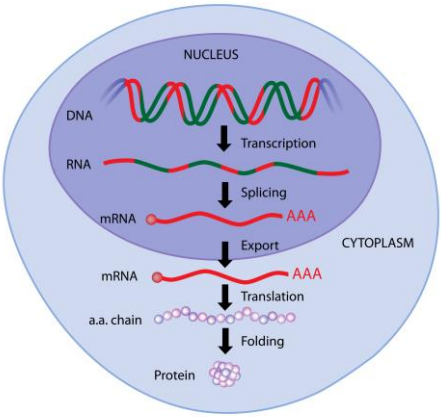

Figure 2/6 Protein-creation sequence from DNA

Each gene contains the information for the construction of a *single* element of our body. As the hard drive in a computer contains its operating system, genes contain data to construct and function the operating elements of our body. Even now, however, it is not entirely clear how this information is exactly read and translated.

Genes and Metabolomics

In 1966, Professor Tanaka Kei, at Yale University, described and measured for the first time a congenital disease related to metabolism. Making use of new technologies and brilliant clinical thinking, he measured a metabolite (isovaleric acid), which was found in higher concentration in the blood and urine of some children suffering from a rare genetic disease. Tanaka's finding wrote a new chapter in the history of medicine.

After Tanaka's discovery in 1966, it was possible to measure metabolites related to different genetic diseases, such as the connection of severe mental retardation with phenylketonuria. Today, all new-borns are screened for the presence of congenital metabolic diseases, and 4,000 genetically inherited diseases have been identified.

Despite the continuing discoveries in the field of genetic abnormalities, results of research regarding the association of the most common chronic diseases (diabetes, heart disease, cancer) with genes are so far disappointing. Based on gene identification alone, we still ignore whether a person will develop a certain disease.

The initial hypothesis was that, by recording the DNA map, one could associate each gene to a single, specific function or condition. Every single person would then have his/her own DNA map and, therefore, should behave in relation to disease and health in a predictable fashion. Further, people should have a predetermined IQ, concrete features and physical possibilities, as well as maybe a reasonably outlined personality.

The problem arose as we realized that each gene did not consistently produce the same effect on body operation.

For example, say we provide a geneticist with a copy of our DNA and ask him/her to determine our eye color; he/she will prove fail.

It seems self-evident that heredity is the most important factor in determining our health condition. This is nonetheless untrue and a common misconception. Admittedly, people in the same family may have the same diseases for similar ages and conditions. Of course, there is

a common predisposing factor, given that one starts from a similar genetic code. However, the most important factor is that people of the same family tend to have similar habits.

We now know that a single gene can produce up to 31,000 variations of the same information contained therein by varying epigenetic factors. For example, two brown-eyed parents could have a green-eyed child.

Experiments have shown that, in mice with identical genes that should encode a brown color skin as that of the mother, researchers managed to produce several variations of their skin color by changing external factors to DNA such as food.

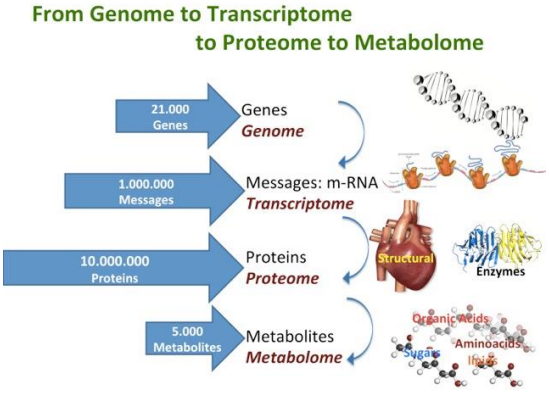

Figure 3/6 The human body contains 25,000 genes which can produce 10 million protein variations. There are however only 5,000 metabolites providing real-time information on the body's operation.

Practically this means that you can have normal genes and yet manifest a disease, or have problematic genes and never suffer from it.

Similarly, every human body starts from twenty-one thousand genes for which you can have up to ten million variations and infinite combinations between ten million results.

Our genes are not static as once thought; they are dynamic units that regulate their expression depending on the surrounding conditions and environment (epigenetics).

The human body is able to change its programming and optimally adapt to its environment. The problem arises though if the environment is too far removed from the ideal; in such situation, the body strives to adapt with "solutions" that are not compatible with its optimal function, and the disease manifests itself.

The new discovery represents a major step forward for the science of biology: from the era of genetics to that of *epigenetics.* Epigenetics is the biological science that deals with factors influencing gene expression (the way in which genes respond to external stimuli), such as nutrition, toxic load, deficiencies of nutrients, our mood, exercise, etc.

It comes from the Greek words epi-(above) and genetics. Epigenetics states that there are factors beyond genes that regulate their function positively or negatively. It is a scientific revolution of enormous importance and its effects will be felt for years to come.

Genetics and Epigenetics: what is the fairest of them all?

All this means that our current and future health is not solely defined by DNA anymore. While the genetic code certainly influences the final result, it is estimated that its

influence in the manifestation of a disease does not exceed 25%. For the remaining 75%, our health is regulated by epigenetic factors and is thus in our hands. The choice is ours to exploit this power in a positive or negative manner.

In a study published *in the Archives of Internal Medicine* in 2009, entitled "A healthy lifestyle is the best revenge", 23,000 people were followed for 8 years. The purpose of the study was assessing the extent to which three chronic diseases, which are the leading cause of mortality *(cardiovascular disease, cancer and diabetes)*, could be prevented by following a healthy lifestyle. The following four health factors were considered:

1. Non-smoking
2. Avoiding obesity
3. Practicing exercise more than 3.5 hours per week
4. Following a healthy diet.

Results were amazing! Those meeting all health requirements had a lower overall risk of presenting a chronic disease of 78%.

In the western world, the general population is starting to change its lifestyle towards more natural habits. Even if the response of the social mechanisms is usually slower, health systems, universities, scientific authorities etc. we have noticed some encouraging signs of change. We are witnessing revolutionary changes at scientific and medical level. However, this revolution will not happen out in military battlefields. Indeed, it is taking place in research laboratories and in the minds of eminent researchers and physicians. Medicine is moving from an era where fate

largely determined a patient's health condition to one where we are taking health in our own hands.

***Epigenetics** is the science that deals with factors influencing gene expression, i.e. the way in which genes respond to external stimuli such as nutrition, toxic load, deficiencies of nutrients, our mood, exercise, etc.*

For more information and references visit:
www.einum.org/150years

Chapter 7

Small machines regulate the function of the human body in perfect orchestration and at stunning speeds!

Enzymes, the machines of life

We have seen how genes operate as units containing data for the formation of the human body. By way of analogy, genes are the hard disk containing all programs that regulate computer operation. This information is used (transcribed into messages) within each cell to form proteins.

In turn, proteins accomplish two main functions:

1. Structural proteins (form organs, bones, muscles, skin, hair, etc.)
2. Protein with enzymatic activity (enzymes)

Enzymes are microscopic "machines" performing high-speed chemical reactions. Enzymes are found everywhere in the body, inside and outside the cells, in digestive juices and wherever chemical reactions occur. Enzymes are intended to favor chemical reactions that help life.

In essence, an enzyme brings together or separates two or more substances: chemical reactions occur thus much faster than they would in the absence of enzymes. (See figure).

Thousands of enzymes catalyze (speed up) continuously the corresponding reactions in our bodies. Chemical reactions occur *randomly* in every organism. In fact, body

chemicals naturally react with each other. However, reactions catalyzed by enzymes occur at such speeds that random chemical effects are negligible.

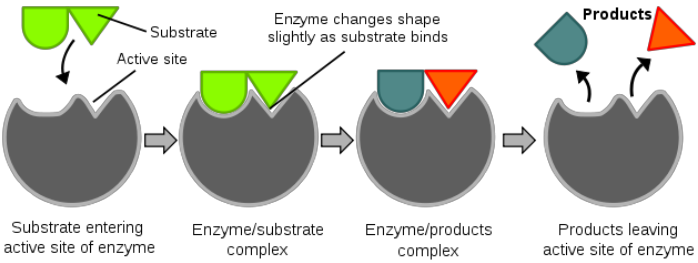

Figure 1/7 Enzymes (represented as a semicircular shape above) attract substances and break them down into two elements. Enzymes serve as catalysts, i.e. speed up chemical reactions.

An enzyme can perform millions of reactions in a second. For example, the same chemical reaction between two substances may take 78 years without enzymes or 25 milliseconds with them. Thousands of enzymes create precise biochemical pathways, each of which performs a different function.

Enzymes, with their ability to facilitate specific reactions at incredible speeds, constitute the unique function of each individual living organism.

Enzymes form chemical cascades where a substance is transformed into another and this, through the action of another enzyme, is transformed into the next and so on.

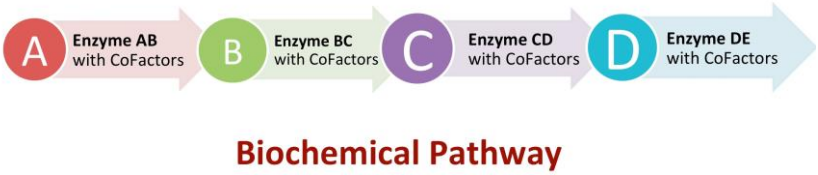

Figure 2/7 Provided sufficient nutrients (cofactors) are available, the biochemical pathway responsible for energy and tissue creation is successfully performed with the aid of enzymes.

Enzymes require the so-called co-factors for activation. These may be *vitamins, minerals or aminoacids.*

Until a few decades ago, co-factors were taken for granted because our foods had a high nutritional value. Today, however, we acknowledge that the lack of these essential ingredients lies behind numerous chronic diseases. If nutrients necessary for enzyme activation are insufficient, enzyme-regulated processes will slow down or lock completely.

Enzymes, however, differ amongst individuals.

Indeed, each of us has a particular enzymatic activity. Because of this enzymatic singularity, each human being presents a unique physical appearance. Our enzymes differ in the same way some are tall, blond, with dark skin or red hair.

Furthermore, identical enzyme types may require different co-factor amounts in each individual. An enzyme in a person may demand a minimum of 50 mg of vitamin B1 to function properly, whereas the same enzyme type in a different person may take 150 mg of the same vitamin to perform the same type of function efficiently.

Under natural conditions, all substances necessary to sustain vital functions can be found abundantly in nature and enzymatic changes would not be noticeable except in extreme cases. For some people, and again under normal conditions, the available quantities of vitamins, minerals and amino acids are sufficient to maintain vital functions. For other people, however, under the same conditions, higher amounts of certain co-factors might be required which are not provided via regular food intake.

If an enzyme involved in a metabolic pathway fails to operate properly, it blocks the flow of chemical reactions while leading to metabolic disorders that manifest as diseases. The diagnosis of metabolic diseases is accomplished through analyzers designed to detect very small molecules in the blood and urine (high resolution mass spectrometers). Thus, the blockage of a metabolic pathway due to the deficiency of an enzyme is evidenced by the accumulation of one or more metabolites, which can be detected in a person's blood or urine.
By measuring the different metabolites, we can identify blocked metabolic pathways and then administer missing co-factors in therapeutic doses. As the body has sufficient nutrients available, it restores the normal function and health.

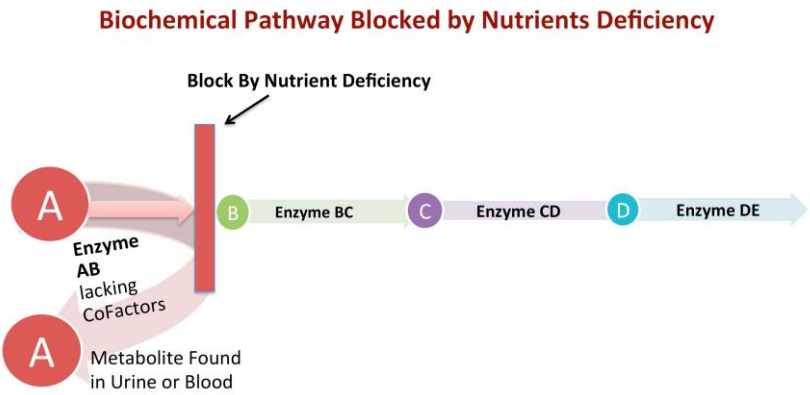

Figure 3/7 Biochemical pathways are blocked whenever nutrient deficiencies arise. In turn, this leads to reduced energy and tissue creation and the anomalous presence of metabolites in urine.

Metabolic profile

The first to suggest the existence of metabolic individuality was Roger Williams in the 40s. However, it was not until the 70s that technological developments would allow to measure precisely these metabolites in body fluids.

In the seventies, Linus Pauling (now considered the father of Metabolomics) and Arthur Robinson developed further research on individual metabolic profiles to check nutritional deficiencies. In 2007, the Human Metabolome Project, the mapping of all human metabolites, was completed.

From the forties onwards, Metabolomics has become the method that most accurately reflects a person's health condition and, at the same time, makes it possible to identify early signs of a disease many years before its time.

Measuring metabolites can give us a true picture of metabolism and allows identifying the nutritional deficiencies of a person in real time. Metabolomics is a tool of enormous value to doctors practicing Nutritional Medicine. Based on metabolomic analysis, your doctor may define very precise nutritional and supplement regimens.

For more information and references visit:
www.einum.org/150years

Chapter 8

In ancient times, it was considered that diseases were caused by gods. One fell into disfavor of the gods and simply fell sick.

Even today, it sometimes seems to me that the way we deal with the problems of health at the social level does not differ much from that of antiquity. If some serious illness hits us, we regularly talk about bad luck. Along those lines, it is not uncommon to hear about people who were very careful about their health and fell seriously ill. From this observation, people naturally conclude that it is irrelevant whether to pay attention and live a healthy life or not.

Quite the opposite! Indeed, there are very specific reasons that cause diseases and they can be largely and directly controlled by us.

Why do we fall ill?

(Stress and Health)

We have seen how our body tends to be healthy and biochemical imbalances make it susceptible to diseases. However, there is an additional factor that works as both root-cause and trigger, turning a predisposition into disease. This factor is stress.

It is plain to see that propensity to disease increases significantly after stressful periods. According to the CDC (Center for Disease Control in the United States), over 90% of doctor visits are due to diseases associated with stress! Risk increases with the intensity and duration of stress.

What does stress really mean and how is it connected to sickness?

In our minds, the concept of stress is primarily tied to factors of an emotional nature. First of, we shall clarify that stress is not always related to what actually happens but what we perceive thereof. A certain factor may be stressful for one person and irrelevant for another.

Stress is our body's hormonal response to a factor perceived as a threat to survival. Threats may be real or perceived as such.

Examples of real threats to survival are cold, fatigue, extreme physical exertion, hunger, surgery or being attacked by a wild animal.

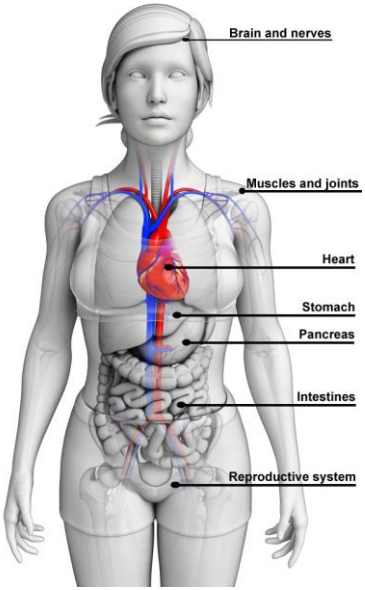

Figure 1/8 Organs affected by stress.

Perceived threats may be fearing poverty because of the financial crisis, perceiving a verbal attack as if being attacked by a wild animal, losing loved ones or the fear of losing them.

When the body is in trouble, it releases hormones that activate mechanisms designed to increase our ability to survive the perceived danger. Stress is this hormonal response. Adrenaline, cortisol and other hormones that increase blood perfusion in organs such as the heart, muscles, brain and lungs are secreted mainly by two glands

that are on top of each kidney, thus called suprarenal glands or adrenal grands.

The stress of life

The endocrinologist Hans Selye was the first to describe the nature and mechanisms of biological stress. In 1956, he published the book "The Stress of Life", where he described the hormonal mechanisms of stress. In his experiments, Selye injected mice with solutions containing organ extracts. He discovered that each injection caused changes to the hormone system of mice.

At first, he thought he had discovered a new type of hormone. However, he noticed afterwards that the infusion of any toxic agent caused the same results, regardless of the type of extract used. The reactions observed by Selye were very specific, including swelling (edema) of the adrenal glands and the presence of stomach ulcers.

This finding, together with the observation that *patients with different diseases share common symptoms,* led to the formulation of the term *stress* as a causal factor for disease.

Today, the term stress can be found in the majority of languages worldwide. Selye's work is a very important step in the advancement of medicine, because it allowed us to understand the key hormonal mechanism behind any acute or chronic illness.

We are now going to examine how these data operate in practice. We often see parents who keep their children from drinking cold water or iced drinks to avoid catching a

cold. The sudden drop in temperature due to frozen drinks is a factor of biological stress to the upper respiratory tract. Thermal stress suffered by cells in this part of the body can lead to disease. Similarly, if you expose the entire body to cold for long periods without adequate protection, you can develop fever or pneumonia.

Another type of stress of a biological nature may be that of lifting a heavy object. In this case, the burden on the back constitutes a physical stress that may manifest as back pain.

The examples described above are fairly common and easy to observe in everyday's life. However, you neither suffer from a sore throat every time you drink ice water nor all those moving a heavy object appear to have back pain. On the other hand, you surely have noticed that some people are more resistant than others to disease and vice versa.

In a recent study announced by the Academy of American Science (PNAS), researchers observed two groups of people who were voluntarily exposed to viruses that cause the common cold. It was observed that the group previously exposed to chronic stress had significantly higher odds of manifesting inflammation and falling ill. Exposure to chronic stress causes high levels of cortisol initially. The suprarenal glands though cannot keep up in producing high amounts of cortisol for long periods. The body’s ability to release enough cortisol deteriorates, which in turn affects the body's ability to regulate inflammation.

In life, we may be exposed to several stressors simultaneously. Physical fatigue, poor nutrition, radiation,

microorganisms and emotional tensions overlap as stressors.

The health condition opposed to the stress experienced at any given time depicts the overall picture of our health.

A body in perfect biochemical balance can withstand significant stress without falling ill and, if this happens, the disease will be less serious and shorter.

What can we do about it

A better health condition makes our body more resistant to external factors of stress. To function properly from a biochemical point of view, our body requires the presence in sufficient quantities of five essential factors:

- Oxygen;
- Water;
- Macronutrients (fats, carbohydrates, proteins);
- Micronutrients (vitamins, minerals, amino acids, antioxidants, enzymes);
- Physical exercise.

The human body is a machine designed to operate under specific conditions of temperature, nutrition, concentration of oxygen, radiation, geomagnetic and gravitational fields. Any sudden changes in these parameters are a source of stress and probable cause of disease.

Thus:

- Consumption of sufficient amounts of water;
- Proper exercise;
- Consumption of unprocessed organic foods;
- Correction of deficient micronutrient via supplements.

Are key to remain healthy.

However, a healthy condition cannot be defined in absolute terms such as being healthy or not. There are an infinite number of steps towards health and the same towards disease. The healthier we are, the farther we move away from disease.

In addition to the factors described above, it is important to consider one's attitude towards life. Biological studies have shown that *the body reacts to perceived stress more so than to what was actually experienced.* While there is an objective factor concerning biological stress, the subjective factor whereby each person perceives the situation experienced, is of the utmost importance.

Our mood directly influences the function of the endocrine system. Every thought creates its corresponding emotions and these are in turn translated by the body in hormonal secretions. Different emotions such as sadness, fear, anger, fulfilment, or joy produce diverse hormonal secretions. Emotions are the bridge between our thoughts and our endocrine system.

While controlling our emotions is not an easy task, we can exercise control over most of the stimuli that make us think and feel in a certain way. The things we read and listen to and individuals we choose to be around of, do have a surprisingly important influence on our mood and, ultimately, on our health.

It is fairly easy to draw the attention of a person to negative or potentially dangerous items. The adrenaline released at a similar time points our attention towards the imminent danger. For example, if attacked by a bear in a forest, it would be hardly productive to keep on gazing, in utter peace and quiet, at the reflections of sunlight rays between the leaves of a tree. Nature provides for our survival by releasing adrenaline into our bloodstream and thus directing all our attention towards the source of danger - a bear in this case - while focusing our thoughts in finding the best way out.

This survival mechanism is very often used by people to attract the attention of others to certain items by overstating their dangerousness. In addition to people, however, this mechanism is used by mass media to draw our attention. Today, it seems as if anything bad, alarming and dangerous happening anywhere in the world makes the news and find their way in our homes, while good stories are regularly overshadowed. Thus, one may have the impression that only negative and dangerous things happen around us. Our body reacts to this constant sense of danger releasing stress hormones. Our mood worsens, due to adrenaline secreted, and we live in a permanent state of emotional and physical stress.

In ancient times, Kings were in the habit of beheading those who consistently brought bad news. Beheading people seems hardly practical and ultimately useless, as you will soon get to a point where you will only have headless bodies around you.

I propose conducting an interesting experiment: for two weeks, try to avoid anything that can create negative thoughts and feelings. Do your best to receive and communicate good news, express positive comments and give greater importance to the good and beautiful things that happen in life. Try to stay in the company of people who make you feel good.

For these two weeks, avoid newspapers, TV and do not use the Internet as a source of daily news. Fear of being out-of-sync during this period? Bear in mind that most mass media content does not convey actual information. In most cases, media deals with personal comments and conclusions on someone else's predictions and speculations. Try this experiment, and you will notice such a radical emotional change that I am sure this will become for you a stable modus vivendi.

In our era, technology has taken our ability to help and destroy to hitherto unknown levels. The overall picture of our lives and society is not something vague; it is constituted by the actions and omissions of each one of us.

We should never underestimate the changes that we can make to our lives and those of others, starting with those things that we can effectively influence, even in a lesser way. No matter how small the improvement might be, this also applies to our health, society and the environment

surrounding us, what matters is our constant daily improvement.

For more information and references visit:
www.einum.org/150years

Chapter 9

Now that we have established what is wrong with our food, it is the case to determine what we can do to get the maximum benefits from natural and healthy eating

Nutritional guidelines.

Eating healthy and natural.

Every year, thousands of books are published worldwide on nutrition. Various types of diets and simple, strange or even extravagant approaches create a real confusion in those who must choose their diet.

Let us see how the principles described so far can help in this choice.

In the first chapter, we saw that the body is naturally inclined to be healthy.

Then, we have found that being healthy demands the necessary substances to complete its physiological functions.

In chapter four, we have verified that it is now an established fact that today's food cannot meet these requirements, and that this is the main cause of chronic diseases.

Our body is genetically programmed to follow a diet that would naturally fulfil its nutritional needs.

In theory, a human body under this diet should function optimally. We can call this diet "The Natural Diet of Man". As of this date, no specific studies have been conducted to determine the natural diet of man. The absence of

consistent data in this regard largely explains the existence of an infinite number of theories and diets.

Food problems of the human species arise from our omnivorous nature. For example, sheep and lions, exclusively programmed to eat grass and meat respectively, have no issues following a natural diet. Man, however, can eat and drink substances with no nutritional value whatsoever. We can eat synthetic "food", formulated in the laboratory, whose colour and flavour was added artificially by means of chemicals.

Therefore, choices are endless and mainly driven at present by data provided by the food industry. We should not base our decisions on data of commercial origin, because the goal of every business is to turn a profit and not to fill the gaps in science. It is by no means a coincidence that over half of the population in industrialised countries is obese or overweight and chronic diseases are increasing.

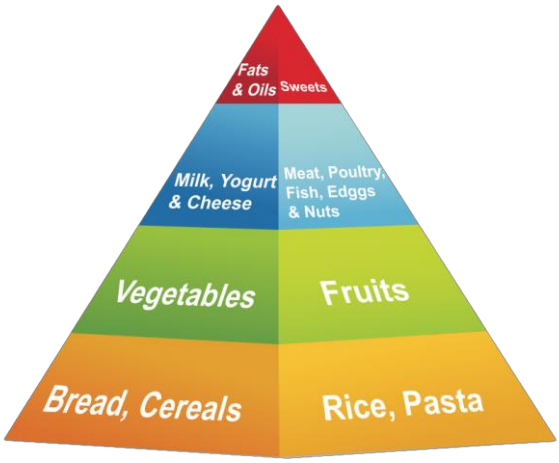

Figure 1/9 U.S. Department of Agriculture (U.S.D.A.) Food Guide Pyramid. Favours cereals and grains as primary source of energy.

To better understand the extent to which the food industry affects our diet, just consider the "Food Pyramid". This very familiar piece of information, however, was not produced by some scientific institution, as one might think, but by the United States Department of Agriculture (USDA). Not surprisingly, the purpose of the USDA is to promote its products. Cereals are the main food of the agricultural industry of the United States (corn, soybeans, wheat) and should represent, according to the USDA, a large part of our diet.

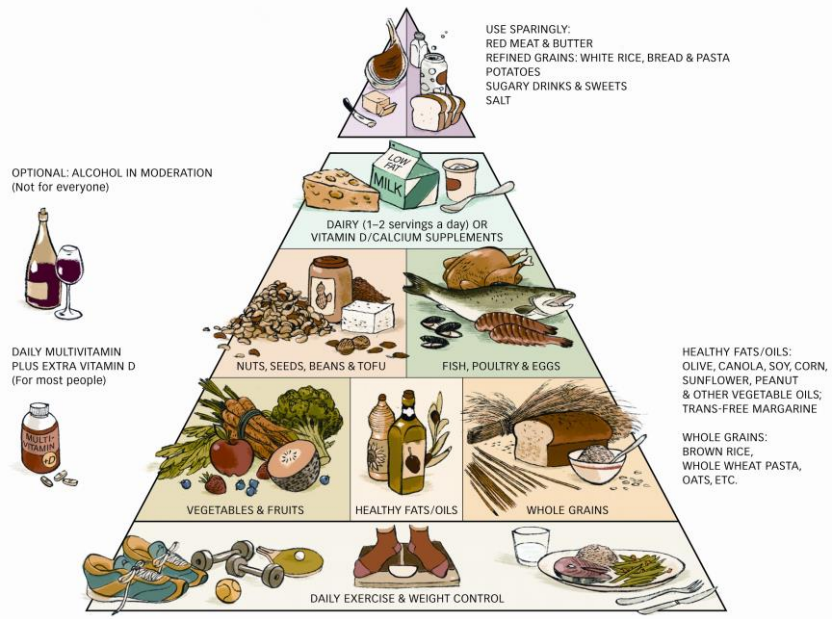

Figure 2/9 Food pyramid for a healthy nutrition proposed by Harvard School of Public Health. Indicates the foods for a proper nutrition based on scientific evidence.

To provide the right data on the subject to the public and the scientific community, the Department of Nutrition at the Harvard School of Public Health announced the "The Healthy Eating Pyramid" in 2005, describing a completely different diet. At the base of Harvard's pyramid, we don't find cereals but weight control, exercise and consumption of water in sufficient quantity. Cereal grains must be whole and consumed in much smaller quantities (one third of USDA's). The pyramid of Harvard refers to the consumption of good fats such as olive oil, nuts and fermented foods. In 2011, the USDA announced the "My Plate" to replace the pyramid. The answer from Harvard came a few months

later with the «Healthy Eating Plate" and even that one differs completely from the USDA.

Harvard's pyramid and plate, beyond making recommendations based on scientific data that are relevant to nutrition, also incorporate factors such as weight control, exercise, intake of multivitamin supplements and vitamin D for most part of the population.

In Search of the Natural Diet of Man

Therefore, it is vital to identify the Natural Diet of Man to be healthy. A valid research model would consist of:

1. Assessing body composition and nutrition of healthy people.
2. Repeating the same process with sick people.
3. Comparing data found in both categories.

After thousands of clinical cases and several thousand metabolomic analyses (more than ten thousands), which were performed to determine the nutritional status of people belonging to both categories, I had the opportunity to check what diet types actually contribute and to what extent to a healthy life. Healthy people have a consistent tendency to make dietary choices that go in the right direction, while sick people tend to make consistent choices in the opposite direction. There are various intermediate steps between the nutritional practices of an individual enjoying excellent health and a sick one, which express

different combinations and proportions between the right choices and those favoring disease.

At this point, it is interesting to note that, in both cases, the person may sincerely believe to make healthy dietary choices, while these may be actually very unhealthy. A person can make enormous efforts to eat healthy and still be wrong in fundamental decisions, without attaining the desired results. This confuses a great deal those who do it and, eventually, come to believe that dietary choices have nothing to do with health and abandon everything.

Through my research in identifying the natural diet of man, based on my clinical experience and through the use of metabolomic analysis in thousands of cases, which allow us to ascertain the nutritional deficiencies in every single person, I came to the following conclusions that can serve as guidelines for a healthier and natural diet.

Consumption of foods in their natural state

Our food should be as close as possible to their natural state. Unprocessed whole foods contain intact nutrients and are closer to the physiology (normal function) of the human body.

Foods deemed unprocessed such as meat, fish, milk, dairy products, cereals, legumes, fruits and vegetables can still be seriously altered as a result of the breeding and cultivation methods applied. Calves, for example, need to graze the grass instead of eating corn or artificial feed. If a cow eats grass, its meat contains a high proportion of omega 3

(beneficial fats) compared to omega 6 (fats harmful to health). The same thing applies to eggs, milk and dairy products.

Fats and health

Omega 3 and 6 are fat molecules (fatty acids).

Fats perform three main functions in the human body:

a) structural, form cell walls;

b) as a main energy source, are burned within cells to produce energy;

c) participate in the formation of most hormones.

The ideal ratio of omega 3 to omega 6 in our diet should be 1:1, i.e. an omega 3 molecule per omega 6 molecule. In today's diet, this ratio is instead of 1:16! In other words, there is an excessive amount of omega 6. In analyses carried out in recent years, I came across cases - particularly in young people - with 1:40 ratios and even higher. These were due to diets almost devoid of natural food.

When the proportions of the various fatty acids are altered, the integrity and function of cell walls, which enclose the cells in our body, are accordingly altered. Simply put, it is like trying to erect a building with tons of cement and very little iron, bricks and timber. How would you say this building will fare?

The membranes of our cells are mainly formed of fat; an alteration of their composition makes them more rigid or more flexible than normal, which influences the passage of nutrients through the membrane and, ultimately, the global function of every cell and body organ.

Diets rich in omega 6 have an immunosuppressive action and may increase the risk of cancer up to twenty times. It has been observed that the more you decrease the omega 3 to omega 6 ratio in diet, bringing it closer to its ideal proportion, the more you reduce heart disease mortality - up to 70%. Ratios closer to the ideal also correlate with a reduced risk of breast and colon cancer, and with the decrease of inflammation in patients suffering from rheumatoid arthritis and other inflammatory or degenerative diseases.

These data lead us to the state that a natural diet should contain beneficial fats. Instead, we must avoid harmful fats such as:

- Trans fats;
- Fats from animals that are raised with artificial feed, corn and soybeans;
- Polyunsaturated oils such as those from seeds of corn, soybean and sunflower;
- Margarines.

It is important to consume good fats such as:

- Olive oil;

- Coconut oil;
- Cold pressed organic linseed oil.

And fats found in:

- Nuts;
- Almonds;
- Sardines;
- Eggs from free range hens;
- Flaxseed;
- Organic butter;
- Fat of free-range grass fed animals.

Figure 3/9 National Geographic, September 1969.

The culture that began in the sixties with the propagation of data that urged people to avoid animal fats and consume trans and polyunsaturated ones, proved to be catastrophic. In fact, it led to increased consumption of grains and refined carbohydrates, which are connected with the majority of chronic diseases such as heart disease, cancer, obesity and diabetes.

With regard to cereals, fruits and vegetables, large-scale European studies have shown that organic products have a higher nutritional value than those of conventional cultivation. The nutritional value of plant foods is directly proportional to the wealth of mineral salts contained in the soil where they were cultivated.

Grains

A great part of the population cannot consume grains such as cereals and legumes without noticing health problems as allergies, intestinal discomfort, weight gain, autoimmunity etc. due to their gluten and lectin content. Lectins are plant defense proteins found mainly in grains and other vegetable foods with the purpose to protect the plant and its seeds causing toxicity to the insects, animals and humans that consume them. Modern hybrid and genetic intervention in plants have further increased their natural content in gluten and lectins in an effort to make crops more resistant.

But for those of us that can consume grains without averting negative health effects the best choice would be to consume the ones that have the highest nutritional value, the lowest glycemic index and contain little or no gluten:

- Barley;
- Spelt;
- Kamut;
- Oat;
- Quinoa;
- Buckwheat;

are some of them.

Have you ever wandered why grandma soaked legumes? Soaking legumes in water with baking soda for 48 hours and changing the water often before cooking helps neutralize the lectins contained in them.

Alkaline and acid foods: using them appropriately

All categories of natural foods are important to attain an optimal health condition. By this, I mean both plant foods and those of animal origin. At various times, the human body demands different categories of macronutrients, micronutrients and foods of both animal and vegetable origin.

In recent years, there has been a movement in favor of alkaline foods and vegetarian diets. Furthermore, it is true that the body produces hormones that promote an acidic environment within the body under difficult conditions (stress).

In such a situation, our body needs an increased intake of alkaline foods, mainly of vegetable origin, to help decrease its acidity and bring it to a neutral pH (pH is the scale of acidity or alkalinity of a solution, goes from 0 to 14, where 0 is the highest acidity and 14 the maximum alkalinity. A pH of 7 is neutral. The ideal pH of the body is very close to neutral with a value of 7.41.)

Following a stressful period, it eventually comes a time when the body needs to repair the damage. In this phase, the body's environment becomes slightly more alkaline. Therefore, acidic foods, mainly of animal origin, are required to decrease alkalinity and balance the pH of the body. In addition, foods of animal origin contain highly assimilable proteins, which are necessary in a reparative phase to the formation of enzymes and tissue regeneration.

After completion of the repair phase, the body goes back to its normal function and needs a diet balanced between

animal and vegetable foods, in accordance with the physical activity performed, lifestyle and metabolic characteristics of each individual person. For example, if a person performs an intense physical activity, he/she should increase the protein intake. However, if a person leads an emotionally stressful life, he/she must increase the consumption of vegetable foods.

The majority of the population is in a condition of constant metabolic stress; the body works under stress due to nutritional deficiencies. Metabolic stress creates an acidic environment. Therefore, an increase in the consumption of alkaline foods would bring an initial feeling of well-being and help improve the health condition of the majority of people. However, if you continue to eat mainly alkaline while entering a reparative phase where acidic foods are necessary, the body fails to execute repair processes, generating a new metabolic stress and creating a vicious cycle.

Avoid artificially processed foods

In both cases described above, one must however avoid the consumption of artificially processed foods, as these deliver a strong acidifying effect while their nutritional value is very low. The best example thereof is soda drinks: they contain phosphoric acid and present an extremely acidic pH (2.3-3.2). To maintain its pH at 7.4 after consuming this sort of beverage, our body would need no less than 32 glasses of water! Continuous use of carbonated beverages

with sugar or light ones can bring about a state of significant acidity and dehydration.

While foods processed with natural methods - e.g., fermentation - become even more nutritious, foods processed with artificial methods lose their nutritional value during processing and have a negative effect on our health in proportion to the number and amount of artificial substances contained therein.

If you wish to understand what is meant by artificially processed foods, just check out the products on display in the corridors of a modern supermarket. 90% is highly processed food. Cereals in different forms are sold in colorful packaging and provide consumers mainly with calories and sugar, causing significant biochemical imbalances.

In the last fifty years, we have strived to avoid fats and increased the consumption of sugar, simple carbohydrates and artificially processed foods. Once rare health problems such as diabetes, obesity, high blood pressure, heart disease, gastrointestinal disorders, cancer and autoimmune diseases afflict a large part of the adult population.

We must remember, however, that food, even if carefully selected and of supposedly excellent quality, is far from providing the required amounts of nutrients. While it is now an indisputable scientific fact that we must supplement our diet with the missing elements, this does not mean that we can neglect our diet. In addition to providing necessary nutrients for the human body, food triggers hormonal responses regulating the overall function

of the body. Improving our food choices is a key step to remain in good health.

Based on my experience as a physician in the field of Nutritional Medicine, one could distribute the *biochemical* contribution of the three most important factors as follows:

- Food and diet 40%
- Supplements 40%
- Exercise 20%

We must learn to listen to our body.

As all three factors described above are applied, a very interesting thing happens. The body manages to produce the energy required to perform its functions. An organism producing abundant energy does not require hypersecretion of stress hormones such as adrenaline and cortisol; our endocrine system regains its balance and you perceive again the messages of your body.

Because of hormonal imbalances caused by nutritional deficiencies, most of the population fails to perceive what is happening in their bodies:

- You fail to notice your fatigue until you are completely exhausted.
- You fail to notice your thirst and 70% of the population suffer a considerable level of dehydration.
- You fail to distinguish whether you are thirsty or hungry. The result: you consume much more calories than needed, restrict your water intake and further pursue your food search.

- You fail to notice whether your body requires protein or vegetables. The body does not receive the needed nutrients and increases the feeling of hunger, which usually mitigates through sweets. From that point on, the messages of the endocrine system are such a mess that it is hard to read them without the help of a specialist.
- You fail to distinguish the nervousness arising from lack of rest and nutrients deficiency and the one that is caused by everyday's life problems.
- You experience constipation or stomach discomfort, which adversely affects the mood for no apparent reason. The state of anxiety causes a worsened gastric function that starts an endless vicious circle.

This list could go on forever and encompass any bodily sensation. However, as the body nears its physiological state, a magical thing happens: one gradually begins to hear its messages. We can perceive that we are simply tired, take a break rest and feel again ready to resume everyday's activities.

We perceive whether we need meat, fish or vegetables. After lunch, you experience well-being instead of feeling sleepy, drained and regretful of your poor food selection. At this point, we regain the trust in our body messages, attain a continuous improvement state and are well on the way toward good health.

For more information and references visit:
www.einum.org/150years

Chapter 10

All hope for a magic pill that will cure all ills.

After 25 years of research, I have almost given up on it although I still hold some hope. Though we are not yet able to make a super pill for all ills, there is a substance which appears very close to this definition...

What is the most important factor for our health?

There are certainly many different types of actions we can undertake to improve our health. Which single action, however, would be the most beneficial?

Had you asked me five years ago, I would have said that the most important actions for health were:

- Physical exercise;

- Nutrition;

- Maintenance of normal body weight;

- Restoration of micronutrient deficiencies;

- Intake of sufficient water;

- Sleeping well;

- Reduction of toxic load;

- Having a balanced lifestyle to manage stress.

Today, five years later, I would say that, although all factors mentioned are still valid and bibliography constantly strengthens them, there is a new factor that was just emerging five years ago. It is that of *vitamin D.*

Thousands of studies have proclaimed its importance to our health hence our way of looking at medicine has radically changed. It is truly remarkable that vitamin D acts on almost all the above mentioned factors: increases

physical performance, helps to attain ideal weight, influences the absorption of minerals, favors good sleep and stress reduction, promotes the mechanisms of detoxification and excretion of heavy metals from the body and strengthens the immune system.

Vitamin D and its effects on health

It has been found that high levels of vitamin D in our blood are associated with:

- Reduced *all-cause mortality*;
- Reduced incidence *of breast cancer* by up to 77%;
- Reduced incidence *of colon cancer*;
- Lower incidence of *prostate cancer*;
- Reduced incidence of *diabetes* in adults and children;
- Reduced incidence of *hypertension* and *cardiovascular disease;*
- Reduced incidence of *depression*, especially during the winter months;
- Reduced incidence of *respiratory infections*;
- An increase of 20 ng/ml of vitamin D levels in blood reduces the risk of *multiple sclerosis* by 45%;
- Reduced incidence of *autism* and developmental disorders;
- Each increment of 1 ng/ml entails a *loss of extra weight* of 200 g while maintaining the same diet;

- Improvement of *psoriasis*;
- *Differentiation and activation of white blood cells*;
- *Activation and replication of 3,005 genes*;
- Increased production of *200 endogenous* substances with *antibiotic* activity in the human body.

And these are only a part of vitamin D contributions to our health. If this is not the most important factor to our health, I fail to imagine what else might be. In fact, the scientific community has focused much of its attention on the search of the actions and therapeutic uses of vitamin D. At the time of this writing, there are over 2000 on-going clinical studies on vitamin D.

Medicine has now entered its "Post-vitamin D" era.

What are the ideal levels?

What are the ideal levels and what should be your vitamin D intake to enjoy all possible benefits? Although this is an issue that does not seem to be completely resolved by the scientific community, according to a study conducted and published in September 2011 by Robert Heaney, a world authority on vitamin D, we need to reach levels above 48 ng/ml to reduce the incidence of chronic diseases.

Always according to Heaney, the normal upper limit is 90 ng/ml whereas toxicity is rare at levels below 200 ng/ml. These are the levels reached in populations living and working in nature, without any sun protection, and are similar to levels seen in primitive peoples. For these

reasons, the focus should be on the dose you should take to achieve vitamin D (OH25D3) levels at least above 48 ng/ml. Ideally, this would be a level between 60-80 ng/ml.

Surely, the best source is still sun exposure. Unfortunately, this is not always possible for most of us, who are sufficiently exposed to sunlight for only 15-30 days a year. We must also bear in mind that this exposure is influenced by the use of sunscreen products (a sunscreen with an SPF of 15 blocks the production of vitamin D from the sun by 99%). In fact, even in Mediterranean countries, it is rare to reach the necessary levels without supplementation with vitamin D3.

Vitamin D acts directly on our genes!

Until not long ago, we considered that vitamin D mainly acted on bone tissue.

The truth is that *vitamin D is a hormone, the most powerful hormone in the human body. It is not the magic pill that we were all waiting for, but it is the scientific proposal that comes closest to such definition for the time being.*

How can a single factor have so many effects on the function of our body? Oxford University researchers have confirmed the action of vitamin D on *3,005 genes.* It was found that each of these genes had a specific receptor for D3. *Vitamin D binds to this receptor and directly controls the operation of a large part of the human genome (the sum of the genes in our DNA).* Considering that more than a billion people worldwide suffer from vitamin D deficiencies due to

low sun exposure, one can hardly overstate the importance of this discovery for our health.

Effects on the immune system

Through the same mechanism, vitamin D is necessary to activate white blood cells. As the body comes into contact with a new virus or bacterium, it recruits leukocytes from the blood - and in particular T lymphocytes - to combat the invader. Each of these cells is programmed to recognize *a particular type of virus or bacterium.*

Thus, for every 100,000 T cells, perhaps only one of them matches the pathogen. These cells need to multiply immediately to prevent the "enemy" from causing disease. To activate T lymphocytes and transform them into natural killer cells (white blood cells of the immune system to recognize and destroy tumor cells and viruses), *we need sufficient vitamin D in our body.*

Once T cells come in contact with a microbial agent, they extend their "antennas" to accommodate vitamin D. If there is an abundance of vitamin D in our bloodstream, lymphocytes jump to action leading to an efficient immune response.

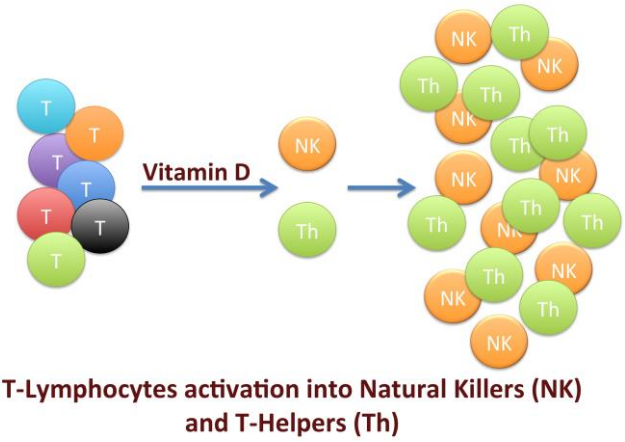

Figure 1/10 Immune system activation through Vitamin D.

Co-factors of vitamin D

It is important to understand that vitamin D works in our body along some components required for its effectiveness. These components are called *co-factors of vitamin D* and are the following:

- Magnesium
- Vitamin K2
- Zinc
- Boron

To avail of all the benefits of vitamin D, we also need sufficient quantities of its co-factors. In short, the most efficient "insurance" for our health would be to provide the

body with these co-factors and keep our vitamin D levels above 48 ng/ml throughout the year. It is easy, low cost and vital to have sufficient levels of this almost miraculous substance.

For more information and references visit:
www.einum.org/150years

Chapter 11

There is a system that is the cornerstone for our health and the first thing to consider on the road to optimum health.

Digestive system: the cornerstone of health

Disorders of the digestive system are among the most common health problems. At any given time, 4 out of 10 people suffer a gastrointestinal disorder, while 7 out of 10 will have a problem of this kind at some point during our lives. These disorders may include:

- Heartburn;
- Bloating;
- Gas;
- Belching;
- Constipation;
- Diarrhea;
- Colitis;
- Ulcers;
- Gastritis;
- Gastric pain;
- Esophagitis;
- Gastroesophageal Reflux Disease (GERD);
- Ulcerative colitis;
- Crohn's disease.

These are just some of the most common symptoms and diseases that affect the digestive system.

When there is a gastrointestinal disorder, the first step is to try and treat these symptoms on their own by changing certain eating habits. If this proves ineffective or if the symptoms become persistent and alarming, the next step is to visit a doctor who, after performing a physical examination, blood tests and endoscopic investigations, prescribes a therapy based primarily on medicines with anti-acid action.

These medicines suppress gastric acid secretion and constitute one of the three biggest selling categories of prescription drugs worldwide (the other two are cholesterol drugs and antidepressants). Unfortunately, stopping this therapy once underway proves difficult without experiencing even more violent symptoms as a consequence.

An ever-increasing number of people, however, are becoming very skeptical about taking drugs unless they really are necessary. While they are very effective in suppressing symptoms and managing serious situations, for short periods, they can have serious side effects in the long term.

For example, the suppression of gastric acid secretion prevents the complete digestion and absorption of nutrients from our diet, whose nutritional value is already low.

Moreover, prolonged use of medicines preventing gastric acid secretion is linked to the suppression of the immune system, pneumonia, spontaneous fractures, increased

levels of gastrin - which induce the rebound effect of gastric acidity when their use is suspended - diarrhea and a deficiency of vitamin B12, just to mention the main ones.

What can be done to improve gastrointestinal health?

Digestive System and Good Health

It is commonly said that the proper functioning of the digestive system is the cornerstone of good health. What does this really mean?

To better understand the functions of the digestive system, the best place to start is the definition of "Digestion":

Digestion is the process which breaks down food, into simpler substances that can be absorbed and assimilated by the body.

It is obvious from the definition that good digestion is essential for proper operation of all body systems and organs. As already mentioned, a body lacking the ingredients required for the chemical reactions to maintain life (bio-chemical) and form and reshape tissues, inevitably suffers health deterioration.

Digestive System and Immune System

The gastrointestinal tract is the first to come into contact with the elements entering the body such as food, drugs, toxic substances, food preservatives and germs. Not

surprisingly, 80% of the immune system resides in the digestive system.

The gastrointestinal tract is full of lymph nodes (lumps scattered throughout the body that capture and arrest germs and cancer cells. Tonsils are lymph nodes, for example) and are colonized by billions of bacteria. The total number of lymph nodes found along the digestive system is higher than in all the rest of the body.

From birth onwards, our intestine is colonized by germs. The body of an adult has 10 trillion (thousand billion) body cells and 100 trillion germs inside it. Findings published in 2010 in the journal "Nature", showed that the DNA of bacteria present in our digestive system is about 150 times greater than that contained in body cells. Added together, bacteria have 3.3 million genes, while our body cells contain 25 thousand genes.

So far, 1150 different species of bacteria, which are part of the human intestinal bacterial flora, have been identified.

About 85% of these bacteria are pro-biotic, helping the functioning and survival of the body, while 15% are potentially pathogenic.

This means that even those deemed "potentially pathogenic" contribute and promote biochemical functions, which are useful to the body. As they multiply beyond a certain point, however, they can cause disease.

They include candida, streptococci, staphylococci and enterobacteria.

Antibiotics, improper nutrition, the modern lifestyle, excessive consumption of alcohol, sugar, ionizing radiation,

fructose, heavy metal poisoning, preservatives, drugs and stress can affect the balance between pathogenic and probiotic bacteria. Various alterations of the intestinal bacterial flora are associated with different diseases.

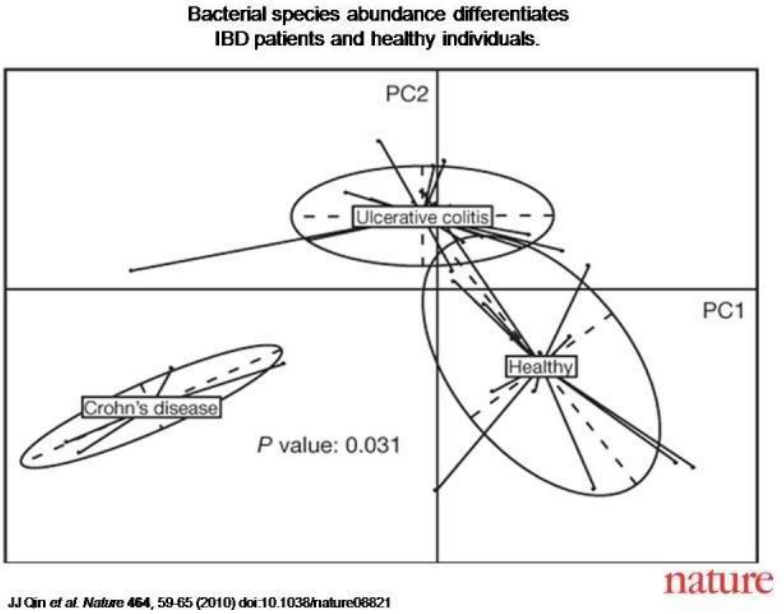

Figure 1/11 A diagram showing the distribution of the number of bacteria of various species present in the intestine in cases of people with intestinal diseases, compared to that of healthy people.

As seen in the diagram, a healthy person has a typical distribution of the number and type of bacterial species, while people with intestinal diseases have different distributions. This information opens up new avenues in the treatment of intestinal disorders and many others.

Intestine: the body's 2nd brain

More and more scientific studies refer to the intestine as the body's second brain.

Lactobacillus, Bifidobacterium	GABA
Escherichia, Bacillus, Saccharomyces	Noradrenaline
Candida, Streptococcus, Escherichia, Enterococcus	Serotonine
Bacillus, Serratia	Dopamine
Lactobacillus	Acetylcholine

Table 1/11 Species of probiotic bacteria involved in the production of substances with effects on the nervous system.

Professor Mark Lyte of the University of Texas has brought nonetheless this concept a few steps forward: according to Lyte, we can modify our mood by taking the right combination of probiotics.

Preliminary research has already evidenced that the condition of the bacterial flora of an organism influences its ability to cope with stress. In particular, experiments on mice have demonstrated that, those that had received antibiotics before being exposed to stress, proved unable to produce the hormones that would have allowed a better response to that condition.

Lyte and his team speak of the birth of a new branch of medicine, *Endocrine Microbiology*. This is the study of the

hormones secreted by microbes themselves (or produced in their presence) and how they affect the functioning of the central nervous system and the entire organism. Microorganisms that colonize the intestine are involved in the production of neurotransmitters. Neurotransmitters are chemicals such as serotonin, adrenaline, dopamine and others that are found in the central nervous system and are involved in the transmission of nerve impulses.

Considering that 80% of neurotransmitters are produced in the digestive system, it is easy to understand the role of the intestine in how the nervous system functions. Table 11-1 shows the types of microbes involved in the production of various neurotransmitters.

Several microorganisms are involved in the production of various substances and the regulation of the body's physiology. For example, GABA (gamma-aminobutyric acid) must be available in sufficient amounts to sleep well, focus and regain tranquility after being agitated.

The depletion of each of these substances is associated with several diseases:

- Dopamine with Parkinson's disease;
- GABA with anxiety and epileptic seizures;
- Acetylcholine with myasthenia and Alzheimer's;
- Serotonin with depression.

This opens up new perspectives for the treatment of nervous system diseases and affective disorders. Even more so, the formulation of specific probiotic combinations for therapeutic purposes is not far off.

Intestine and Allergies

The length of the digestive system is covered in intestinal mucosa, which absorbs and acts as a barrier between intestinal contents and the inside of the body. Under normal conditions, intestinal mucosa is impermeable and prevents toxic substances and harmful microorganisms from reaching the bloodstream. Thus, ingested substances *only* reach the bloodstream *when selectively absorbed through the cells* that form the mucosa.

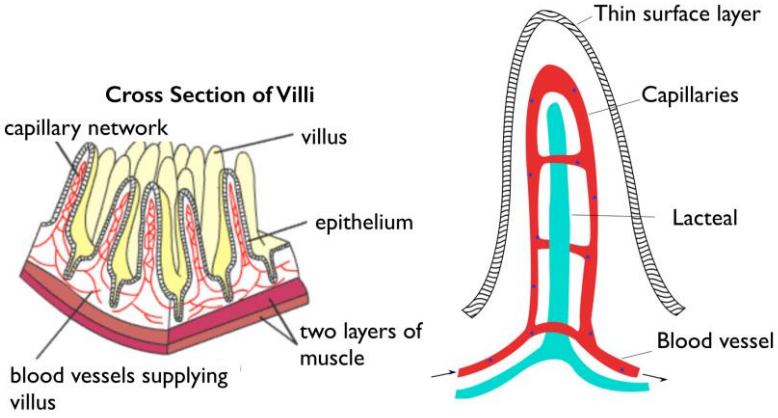

Figure 2/11 Diagram of the intestinal villi. Their purpose is to pass, digested, into the bloodstream. Their excessive permeability is at the origin of food intolerances.

Food is ingested and broken down into simpler substances, as it travels through the digestive system, by the intervention of intestinal bacteria, enzymes and digestive juices. These, in turn, can be absorbed through the intestinal mucosa for the body to form protein, tissue and enzymes, or release energy via metabolism.

As intestinal mucosa loses its imperviousness due to inflammation, drugs, pathogens, the alteration of bacterial flora or other reasons, undigested material penetrates intestinal walls, enters the bloodstream and triggers different types of allergic reactions.

Allergies are pathological reactions of the immune system to substances and microorganisms, which under normal conditions would be considered harmless to the body.

As described earlier, the digestive system is an integral part of the immune system and, according to recent studies, is associated with many manifestations of allergy.

Leaky gut syndrome (intestinal permeability) is linked to diseases of an allergic nature such as asthma, allergic dermatitis and food allergies, but also to systemic diseases, such as heart disease, metabolic syndrome, ankylosing spondylitis, rheumatoid arthritis, juvenile diabetes, autoimmune diseases, autism and cancer.

Intestinal mucosa permeability is largely associated with food intolerances. Therefore, someone intolerant to many types of food is likely to be suffering from leaky gut syndrome. On the other hand, studies on the elimination of these foods, even for six months, have not proved to be effective in improving increased permeability. In fact, it seems that it is increased permeability which causes allergies and food intolerances, not the opposite. The solution would therefore be to treat the permeability in order to solve food intolerances.

What can be done

From what we have seen so far, the issue must be addressed on two levels:

- Restoring mucosa permeability and its function as gastrointestinal barrier;
- Balancing bacterial flora in the digestive system.

Both levels allow for many approaches to ensure optimum intestinal health.

Regarding nutrition, it is necessary to:

- Reduce the intake of processed foods;
- Reduce the intake of carbohydrates and refined sugars (which encourage the growth of pathogenic fungi and bacteria, thereby dramatically changing the intestinal flora);
- Eat food that is as close to its natural state as possible;
- The intake of vegetables, in case of gastrointestinal problems, should begin gradually because the fiber they contain favors bacterial multiplication of both pathogenic and beneficial germs. It is therefore necessary to balance the intestinal flora before increasing the intake of vegetables. The time required varies from person to person and can range from a few months up to a year and a half;
- Drink 2-4 liters of water a day, depending on body weight and time of the year;
- Increase the intake of fermented foods (milk kefir, yogurt, cheese and natto).

The yogurt should be without added sugar and must have undergone fermentation for at least 24 hours. Most commercial yogurt is fermented for only 2-4 hours, which deprives yogurt of the benefits expected from fermented food. The same applies to commercial kefir. For kefir to provide the expected benefits, it must be prepared at home.

At the end of the book, you will find two recipes: one for the preparation of yogurt and the other for milk kefir. Both have great therapeutic powers on the bowel functions.

Proposed Supplements

The analysis below indicates the best supplements to bring the average person's health condition as close to the ideal as possible:

- Amino acid *glutamine* is, currently, the most effective substance in decreasing intestinal permeability. It is the preferred substance for intestinal mucosa cells. An intake of 2-5 grams of glutamine every night helps to restore functionality in intestinal mucosa cells;
- *Probiotics*, of good quality and in sufficient quantity (more than 100 billion bacteria per day, together with the greatest possible number of species), provide many benefits for overall health and that of the digestive system;
- *Digestive enzymes* are a class of supplements that provide enormous benefits for the restoration of normal bowel functions and health condition improvement;

- *Nutrient-rich multivitamin* to provide body and gastrointestinal cells with the substances required for optimal functioning;
- *Vitamin C* to help gastrointestinal motility is probably the most natural solution in cases of constipation. If dosage exceeds the absorption capacity of the intestine, the body excretes the superfluous amount, increasing the transit speed of intestine contents. The dose required for a laxative effect varies in relation to the body's need for vitamin C: the more it needs, the more it absorbs;
- *Magnesium* is also important for the health of the digestive system's cells and can also increase intestinal motility;
- *Vitamin E* for its reparative action. It can be used in situations of chronic inflammation of the digestive tract and to promote healing of the gastrointestinal mucosa;
- C*innamon, oregano and olive leaf extracts* have an antiseptic action on pathogenic intestinal flora;
- *Curcumin* (also known as 'turmeric'), in doses of 500-2,000 mg per day, has a significant antioxidant and anti-inflammatory effect while providing a complementary and synergistic effect on glutamine;
- Administration of a balanced supplement of *omega 3/omega 6 and omega 9* can help solve chronic inflammation and is essential to the formation of properly functioning cell membranes.

Following the diet and supplement regime described above will result in improvements in the digestive system, as well

as throughout the body. Use of the information herein can restore normal gastrointestinal functioning in almost all cases. It may be that some people need more time to achieve optimal functioning, but with the right nutrition and proper supplements, it is almost impossible to fail.

For more information and references visit:
www.einum.org/150years

Chapter 12

What is the most common cause of illness today?

Which group of diseases, which were rare up to twenty years ago, affects the health of more people than heart disease or cancer?

Autoimmune diseases

Autoimmune diseases occur when the body attacks and destroys its own cells and organs. The etymology of the word comes from the Greek "*auto*" which means 'own' and "*immune*", which refers to the immune system.

Autoimmunity is the most common cause of chronic diseases. In fact, autoimmune diseases affect the health of more people than heart disease or cancer.

"In Europe, one in ten people suffer from an autoimmune disorder"

One in ten people in the European Union suffer from an autoimmune disorder. Fifty million Americans, 1 in 6, suffer from autoimmune disorders, while the respective figures for coronary heart disease are 1 in 20 and 1 in 14 for cancer throughout adult life.

It is an unprecedented epidemic that is worsening at an alarming rate. Its impact on public health does not yet appear to have been fully felt, mainly because it affects different organs and tissues, so that each case is considered a separate disease.

Diseases such as:

- Multiple sclerosis;

- Juvenile diabetes;

- Rheumatoid arthritis;
- Hashimoto's thyroiditis;
- Psoriasis;
- Ulcerative colitis;
- Crohn's disease;
- Lupus erythematosus;
- Dermatomyositis;
- Myasthenia Gravis;
- ALS (Amyotrophic Lateral Sclerosis).

Are just some of the hundred or more diseases whose recognized origin lies in autoimmunity. These are chronic, debilitating diseases, which can be potentially life-threatening. What is more, those affected must undergo drug therapies for life. Interestingly enough, most of these therapies are aimed at suppressing the activity of the immune system.

What is the Cause of Autoimmune Diseases

We know that the incidence of autoimmune diseases is related to the standard of living. The higher the standard of living of the populations being studied, the greater the incidence of autoimmune diseases. It is the cost of a lifestyle that continuously distances itself from normality.

Under normal circumstances, the immune system and its army of white blood cells help the body defend itself

against harmful substances and cells such as viruses, bacteria and cancer cells. In patients with an autoimmune disease, the immune system is incapable of distinguishing between the body's healthy tissues and its enemies. This causes an immune response towards the components of its own body.

Theories on the cause and the mechanisms involved in autoimmunity are manifold. Research into the subject is of intense scientific and social interest. However, diagnosis and therapy of these pathologies are complicated by various factors, for example:

- Symptoms concern numerous medical specialties and almost all bodily organs;
- Medical training only provides a rudimentary understanding of autoimmune diseases;
- Specialists are not generally aware of the interrelationships between different autoimmune diseases and therapeutic advances in other specialist areas;
- Initial symptoms are often intermittent and non-specific until the disease becomes overt;
- Research is generally specific to individual diseases and has a limited purpose; a greater information exchange is needed between research projects on various autoimmune diseases.

To fully understand how the body fails to recognize its own tissues and triggers self-destructing mechanisms, it is

necessary to examine the problem at its source: At cellular level.

Cells are the biological units that make up the body. Colonies of cells with common characteristics are aggregated to form organs, which then make up the human body. The functional status of our cells reflects the state of our health. As already explained, every cell, and the body as a whole, needs specific elements in order to achieve optimal functioning: mineral salts, amino acids, vitamins, enzymes, proteins, fats and carbohydrates. Today, it is an incontestable fact that intensive farming, soil depletion and a high level of food processing affect the biochemical balance of the human body.

While changes to food and diets over the past fifty years have been impressive, the lack of nutrients was only part of a broader issue. In fact, this is further complicated by the increased toxicity of food and the modern environment.

Let us consider the spinach by way of example: Plots, which held 100 spinach, now grow a thousand of them. Therefore, soil nutrients, originally absorbed by a hundred plants, are now shared amongst a thousand. This ten-fold yield increase, of course, is only possible through fertilizers.

Fertilizers commonly used in traditional crops (NPK), provide the soil with the three main elements needed for plant growth: nitrogen (N), phosphorus (P) and potassium (K). Under ideal conditions, however, fertile soil should contain 92 minerals. These minerals have been added to the soil over decades, thanks to natural processes such as lightning that fixes nitrogen from the atmosphere, decomposition of organic material, such as leaves, and

processes performed by soil microorganisms. Currently, even the soil of the finest organic farms contains a maximum of 16 mineral elements.

The plant itself, which develops in the absence of 89 elements, suffers and becomes easy prey for parasites, fungi and bacteria. Sufficient amounts of pesticides, antifungal and antibacterial substances must then be used to obtain a good harvest. The entire food chain is therefore affected by a deficiency of elements and the presence of toxic factors.

In fact, heavy metals, industrial chemicals, pharmaceuticals and other compounds deemed extraneous to life (xenobiotics) are unavoidable, even by polar bears in the North Pole, whose tissues carried industrial chemicals. Every living organism on our planet carries a significant toxic load.

The term xenobiotics refers to toxic substances and comes from the Greek "*xenos"* (extraneous) and "*bios*" (life). There are no so-called "normal" levels for substances deemed extraneous to life. They should not simply exist within our body and they present a certain degree of toxicity even when found in tiny amounts. To date, four million chemicals, which are not found in nature, have been produced in laboratories and many of these have commercial and industrial uses. Normal would mean having no trace of these substances in the body.

Our cells are radically different as regards their physiological state whereas their composition has been seriously altered. Vital elements are missing where they

should be, and toxic substances can be found in our cells, where none should be present.

We know that changes to the biochemical composition of cells go hand in hand with changes to the cell membrane properties. The cell membrane is akin to a partition wall that separates the inside of cells from the outside. Among its many functions, the membrane identifies the cell. In fact, there are molecules on the outer wall of the membrane whose function it is to provide the identity of the cell itself. When a white blood cell "reads" the signature on the wall of a cell, it can tell whether the cell belongs to it or if it is an enemy. Our immune system is designed so as not to attack its own cells, but only enemy ones.

Significant alterations of the biochemical composition of cells change their structure and "look". Therefore, the body fails to recognize these cells as its own and attacks them.

This causal mechanism underlies many autoimmune disease variants and opens up new, increasingly effective therapeutic approaches. In particular, it explains:

- Why autoimmune diseases and the standard of living seem connected: the higher a country's standard of living, the more artificially processed foods are consumed;
- Why autoimmune diseases may occur in any bodily organ;
- Why are they associated with both studies concerning nutrient deficiencies (vitamin D, selenium, vitamin A, vitamin B1 and fatty acids) and those dealing with an

increased exposure to toxic factors (dioxins, heavy metals);

- Why an ever-increasing number of people present symptoms involving several organs.

It has been established that autoimmune diseases arise from three factor types:

1. Epigenetic (environmental, diet, deficiencies and toxicity);
2. Genetic;
3. Immune system response.

The huge increase in the incidence of this group of diseases in the last twenty years, and therefore within the space of a single generation, clearly indicates that genetic (hereditary) factors can create a predisposition, but cannot be the main causal factor.

The use of immunosuppressive drugs decreases the intensity of symptoms and helps us understand that the immune system is involved. Their use alone, however, cannot lead to healing, but actually deteriorates the overall health of patients. It appears as though the immune system is working well, a little bit too well (over-reactive) at times. Even this information, however, is not able to provide the answers that would pave the way to solutions. Years of research and therapies aimed at linking the etiology[3] of

[3] *Etiology: the study of the cause of diseases.*

autoimmune diseases to the malfunctioning of the immune system have not yielded the expected results.

A proper solution must be aimed at restoring the biochemical balance and normal functioning of the body. Epigenetics and the alteration of cell functioning and structure due to environmental factors pave the way for more effective solutions.

Nutrient deficiencies must be corrected and the body helped to manage and effectively eliminate toxic substances. The healthier we are, the further we stay from disease.

Cells with normal composition and structure are recognized as belonging to self and, hence, avoid an immune system attack.

What can be done

Metabolomics is a tool of enormous importance in addressing and managing these diseases. Metabolomic analyses allow identifying specific deficiencies and checking the status of detoxifying and antioxidant mechanisms.

"Through the use of supplements, a suitable diet and lifestyle and the use of medication to handle symptoms where necessary, it is possible to change the course of autoimmune diseases"

Stress is also an aggravating factor of major importance concerning autoimmune diseases and must be adequately addressed.

Through the use of supplements, a suitable diet, a healthier and more natural lifestyle and the use of drugs to decrease the intensity of symptoms where necessary, until the body has time to return to normal, it is possible to change the course of this group of diseases. We can help the body move from a condition of continued deterioration to one of continuous improvement.

On the other hand, autoimmune diseases are an epidemic that has not yet fully developed. Nowadays, our understanding thereof is much broader than just a few years ago and we can confidently take steps in the right direction. We can live longer, be healthier and deploy the energy and determination needed to play the "game" of life.

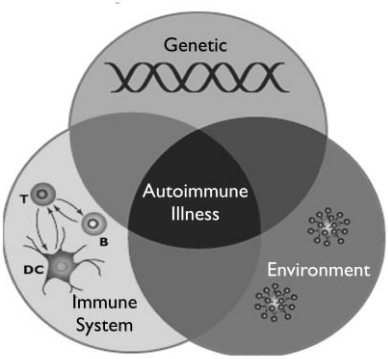

Table 1/12 Autoimmune diseases are caused by a combination of factors related to genetic inheritance, the functioning of the immune system and the environment and lifestyle of a person.

Case study

G.E. 38 years old.

G.E. felt very strong and full of determination to face his professional career, which was already well underway. He worked hard, took absolutely no care about his diet, ate quickly and, apart from some gastric disorders, such as heartburn and intestinal bloating, did not display any serious health problems. An ice cream, some pizza and a nice plate of pasta, some beer, a bit of wine and some fizzy drinks were his reward for working so hard and so well.

Naturally, he realized that his physical condition was not as it was five years before, but he thought that age had started to make its presence felt. He was sure that a month in the gym would get his body back into shape. It was only a question of choosing the right time. A few more months of work and he hoped he would get to the stage where he could plan everything the way he wanted it.

At least once a week he would suffer from headaches, which he resolved immediately by taking painkillers. It was only to be expected, what with all those things on his mind, and he also slept very little at night, but tried to recoup with a nap in the afternoon. For some time he had begun to feel tired in the afternoon, but it seemed normal after all these years of hard and continuous work.

He looked in the mirror and did not like his complexion, he had bags under his eyes, but that's just the way he was: he'd had bags under his eyes even as a boy.

He felt proud of himself for being able to stop smoking three years ago. He was breathing better now and that

nagging cough was gone. His allergic rhinitis had not improved much, but over time he hoped that it, too, would improve.

One day he noticed some mucus during defecation and worried for a moment, remembering that his mother had problems with spastic colitis and had told him that she would see some mucus from time to time. A few months later, however, he began to have attacks of diarrhea, perhaps due to something he ate, he thought. Two weeks later, the diarrhea persisted and now he also saw blood in the feces. Blood tests and a colonoscopy confirmed his doctor's suspected diagnosis: Ulcerative Colitis.

Ulcerative colitis is an autoimmune disease that primarily affects the colon. The doctor explained that it was a disease with which he would have to live for the rest of his life. He would have periods of flare-ups and remissions periods when he would feel better. He would have to follow a regimen of medication even during symptom-free periods. He would need to try and avoid being put under a lot of stress, keeping in mind that diet is not really an aggravating factor. His doctor told him that the real cause is unknown, but that hereditary predisposition, stress and a continuous use of painkillers were triggers of the disease.

Medical therapy immediately brought the symptoms under control, but G.E. began to experience symptoms of depression. He understood that these symptoms were related to the drug therapy and also to the fact that he would have to take these medications for the rest of his life. The mere thought of being perpetually ill drove him to despair.

A quick search on the Internet confirmed his fears and, unfortunately, worsened his emotional state, which was already quite delicate.

The potential side effects of the prescribed medications were terrifying and worse than the disease itself. He tried to decrease the dose and frequency, but the symptoms, diarrhea and blood, were always ready to spring into action.

His emotional state continued to deteriorate. He thought that this health problem had come at the worst time of his life. Why did it have to happen to him?

He began to experiment with diets that he had researched on the Internet. After a few months, the situation had improved slightly, but mainly because of the drug therapy. As soon as he tried to decrease or skip doses of drugs, the symptoms would return.

It was at this point that G.E. came to me. We carried out the necessary metabolomics analyses, changed his diet and supplemented the deficiencies we found. His mood began to improve, while gastric symptoms such as heartburn and bloating disappeared immediately. His complexion began to change, becoming much healthier, as was the case with the bags under his eyes.

Within six months, G.E. was a completely different person. He had more energy and his mood was even better than before he had fallen ill. Nowadays, he no longer needs to take medication, even though he always keeps it at hand in order to feel safe.

Six years later, free of symptoms and without using drugs, he still cannot be completely certain of having been cured, because this is a disease which has both periods of flare-ups and remissions. A new flare-up cannot be mathematically excluded, but he feels much healthier and confident. He almost thinks of his illness as a blessing that allowed him to completely change the way he lives and deals with life.

Now he recognizes when something is not good for his body right away, which foods are good for him, which ones are not, when it is time to rest and when he is thirsty. Things that had been lost along the way. He feels happy that his health is in his hands and is not affected by external factors or by some dark fate.

For more information and references visit:
www.einum.org/150years

Chapter 13

For millennia, the Black Death was a plague the mere thought of which made people shake with fear. Nowadays, a disease, like a plague of the modern era, kills eight million people every year. It strikes suddenly, without warning and its diagnosis is often perceived as a death sentence…

Cancer: a modern plague

There is no doubt that cancer is a modern plague and that its incidence tends to grow steadily.

According to the World Health Organization, *eight million people die of cancer every year.*

Until now, due to the high mortality associated with the disease, the diagnosis of cancer is usually followed by therapies that may have side effects as dangerous as the disease itself. Extreme circumstances are dealt with by extreme therapies. Not without reason, cancer diagnosis is often seen as a death sentence by patients.

In the early '70s, President Nixon announced a war on cancer. From then to the present day, there have been many scientific developments in the field, especially with regard to early diagnosis and the development of surgical instruments and techniques. However, cancer remains the leading cause of death in industrialized countries and the second in those of the developing world.

It seems that the current scientific and therapeutic model for cancer has reached its limits and, if the goal remains to improve results, further avenues need to be explored.

Why haven't we managed to find a cure for cancer yet?

The truth is that continued research sheds new light on how we see this plague. New findings occur with such speed and from so many different areas that, for practical

reasons, they cannot be assimilated at the same rate. *Clinical medicine, nutrition, molecular biology, biochemistry, genetic engineering, biotechnology, immunology, cytology and pharmacology* are just some of the areas of research involved in this topic. When you consider the fact that cancer, like autoimmune diseases, involves all the organs of the human body, the picture is even more complicated as far as research is concerned.

In addition to the factors mentioned above, one must bear in mind that the situation is further complicated by the subjective views of various researchers and scientists. All scientists interpret different data based on their experiences and in accordance with their own scientific models. Drawing together new discoveries, which take place simultaneously in seemingly different fields and disciplines, is a very slow, not to say impossible, endeavor.

It is difficult to find your bearings in this sea of disparate data hence losing your way seems only natural. However, it is vital that doctors navigating these treacherous waters must not lose their clinical point of view (the application of clinical practice) and avail of stable data to assess new ones.

Stable data serves as the cornerstone in building a working system. As seen in the first chapter, a stable finding in the application of medicine is that the body is capable of self-healing. In accordance with this finding, any therapy fostering the body's self-healing mechanisms is deemed beneficial. All these therapies should then be classified in order of effectiveness, which brings us to a second stable finding: getting results.

Medicine is not only defined as *Science*, but also as *Art*. According to Professor Trish Greenhalgh of the London School of Medicine, we have reached a point where we should preferably apply empirical criteria (that comes from experience), at the expense of the usual final sentence of every scientific paper: "Further research is needed to reach definitive conclusions."

There is so much data around us that the current scientific model cannot produce solutions anymore.

New therapies and natural cures

Let us now consider the current process for approving a therapy or drug. After discovering a substance with an alleged therapeutic action, clinical trials must be performed to compare it to placebo (a therapeutically inactive drug) and, subsequently, to other substances used for the same type of therapy. This is repeated several times and in clinical studies involving thousands of people (clinical trials).

The time required for the approval of a new therapy through this process, for each substance, is around fifteen years and the cost varies from one hundred million to a billion dollars.

These procedures are designed like this in order to ascertain the level of safety of *drugs that are produced artificially in a laboratory, bef*ore they reach the market. Natural substances, on the other hand, need not undergo similar processes before being marketed, simply because

they are natural, safe, and their effects have been known and recorded for thousands of years.

Creating an artificial chemical without any toxic and carcinogenic properties whatsoever is as unlikely as discovering a natural food without any therapeutic and anti-carcinogenic properties.

Even if we know that natural substances have therapeutic effects on cancer and other diseases, those selling them cannot claim such qualities for its product unless proven via sufficient clinical research.

In this context, who would spend between 100 million and a billion dollars to prove such a thing? Certainly not a private organization, as natural substances cannot be patented. After it has been proved, for example, that broccoli extract provides an anti-carcinogenic action, anyone would be able to market and sell the extract of broccoli as cancer therapy. In short, one would spend fifteen years and exorbitant amounts of money without ever being able to get it back.

On the other hand, even public services do not seem to fill this void. For example, the American National Institute of Cancer Research, which is the largest public organization in the world for cancer research, allocated eighty-nine million (1.8%) of its 4.7 billion (four thousand seven hundred million) 2004 budget to research on therapies which made use of natural substances.

Until now, this responsibility has been shouldered by thousands of individual scientists and doctors around the world, who incessantly produce hundreds of thousands of studies on the therapeutic properties of natural substances.

Currently, for example, more than 1,540 scientific articles have been published exclusively concerning the therapeutic, anti-cancer and anti-inflammatory properties of curcumin.

The problem of the modern scientist is not the paucity, but rather the multitude of data.

However, before discussing the most effective approaches according to current research, it is necessary to examine data which, much like common beliefs, persists despite being unsupported by current science.

False data has the same effect on our minds as a cork has on a bottle: If the cork is not removed, nothing can be put into the bottle.

Cancer and heredity

The previous chapters examined how the bearing of heredity on our health does not exceed 25%. There are certainly some diseases that can be inherited that have a greater bearing than others. These, however, are uncommon hereditary diseases. The hereditary factor in cancer certainly exists, it is documented and must be undoubtedly taken into consideration. What is its true bearing anyway?

"It is mainly the common habits and environment present in a family which make it appear that cancer is a hereditary disease.
The truth is that it is not"

According to the American Association of Cancer, the overall bearing of heredity on patients diagnosed with cancer each year is between 5%-10%.

90% involve factors unrelated to our genes. These are acquired factors and can therefore be modified. It is important to understand that even in cases that are part of the 5%-10%, heredity depends on a predisposition to the disease, not the disease itself.

It is common habits, environment and a similar lifestyle within the same family, which make it appear that cancer is a disease that is mainly hereditary.

The truth is that it is not!

Cancer and Nature

There is another idea that pervades the issue of cancer, and that sees it as a natural evolution of things. Up until 100 years ago, according to this point of view, humankind had a low average lifespan and cancer did not have enough time to develop.

Therefore, the onset of cancer appears as a natural occurrence, and the more humankind increases its longevity, the more cancer will become a common disease. The origin of this theory is based primarily on considerations that arise from fears inherent to human nature, rather than from purely scientific data.

According to Professor Rosalie David, the author of an article published in Nature Reviews Cancer (one of the most prestigious journals on world cancer research):

"There is nothing in the natural environment that can cause cancer. So it has to be a man-made disease, down to pollution and changes to our diet and lifestyle."

Researchers came to this conclusion after studying thousands of human and animal samples from antiquity.

Taking into account:

- Absence of surgery in ancient times (meaning that those who died of cancer, died without it being removed) and;
- Cancerous tissues are better preserved than normal ones over time.

It should be possible to discover numerous cases of cancer in archaeological finds, especially among patients who died at an advanced age.

Instead, the discovery of cancerous tissues in archaeological human and animal finds from ancient times is extremely rare.

It is thus obvious that factors prevailing in ancient times did not cause the onset of cancer. Consequently, germs, viruses and inheritance alone are not capable of causing cancer in modern times, either.

The main causes of cancer must be ascertained in factors hitherto inexistent albeit present nowadays in far greater quantities:

- Stress;
- Obesity;
- Low levels of vitamin D;
- Lack of micronutrients;

- Artificially processed foods;
- Sugar;
- Environmental pollution;
- Ionizing radiation;
- Man-made sources of electromagnetic radiation;
- Toxic burdens of industrial chemicals;
- Decreased physical activity.

All factors mentioned above have been associated with an increased risk of cancer in separate studies.

It is interesting to note that most of these factors can be managed and influenced significantly.

Optimal levels of vitamin D in the blood are associated with a reduction of 50% in the overall incidence of cancer.

Changes in lifestyle and diet lead to a 36% decrease in its incidence.

Reduced consumption of *artificially processed* meat is also associated with a significant reduction in the incidence of colon cancer.

Numerous studies have shown that exercise and weight loss can reduce the risk of developing cancer by 30-40%.

Finally, it is plain to see that seeking a cancer “cure” in the form of a pill is bound to fail unless true causal factors have been identified.

Stress and Cancer

Emotional stress is a factor mentioned by almost all patients suffering from cancer. In my view, stress is a trigger factor for the onset of the disease. Two different organisms, a healthy and an unhealthy one, may experience similar stressors. The worse a person's state of health, the greater the risk of developing a serious disease in situations of emotional stress.

Multiple stressors interpose with emotional stress, such as oxidative stress (radiation, exposure to toxic substances), physical stress (fatigue, thermic stress), biochemical stress (nutritional deficiencies, dehydration) and metabolic stress (lack of exercise, consumption of high-calorie foods).

At this point, it seems easy to understand how someone who is obese, eats sugar, sweets, pasta, white bread, fizzy drinks, pizza, who does not drink plenty of water and whose only exercise is pressing buttons on the television's remote control, is much more at risk of developing cancer after or during strong emotional stress, compared to a person who is in good health.

How does Cancer occur?

Now that we have understood that cancer is not a condition inherent to natural evolution of things, it is inevitable to ask how it comes about. Is it a mere coincidence or does it begin by the activation of predetermined mechanisms? Is there any reason for its existence, does it serve a purpose or is it one of nature's whims?

Researchers at the University of Arizona in the United States of America, in collaboration with the Australian National University, have developed a new theory on the emergence of tumor cells, which provides functional answers on the true nature of cancer.

What is Cancer?

This is a question to which there has not been a satisfactory answer, until now. The prevalent explanation during the last fifty years is the so-called "theory of mutations". According to this theory, the accumulation of mutations (changes) in DNA during our lifetime leads to destructive changes of the genetic code that cause cancer.

Normally, our cells show "social" behavior and function in harmony in the context of a large colony of cells that are organized in the form of a human body. Changes in DNA lead to some of these cells displaying "irrational" types of behavior. They proliferate in an uncontrolled manner and form one or more tumors that disrupt normal bodily functions through multiple mechanisms.

This stems from the Darwinian theory of evolution, so-called "internal Darwinism". The development of healthy cells is regulated by a process similar to natural selection. Random mutations (changes in DNA) of cells accumulate and eventually lead to malignancy. The lesions and changes in DNA can be inherited (bad genes in the family) or be caused by exposure to toxic agents, such as cigarette smoke and radiation.

The theory of internal evolution has an explanatory worth, but also presents a few, serious inconsistencies. According to the Darwinian theory of evolution, random mutations are usually harmful and cause immediate death. Cancer cells, however, seem to be very "lucky" all the time, because not only do they survive but actually thrive thanks to such mutations. Furthermore, while normal cells undergo programmed death, tumor cells are immortal and multiply indefinitely.

Are randomness and chaos the main reasons that cause the birth of cancerous cells? In contrast to the above, tumors demonstrate a high level of organization in their behavior.

They are able to produce their own bloodstream.

They can silence (deactivate) the genes that suppress cancer (suppressors).

They activate genes that promote cancer (promoters).

They produce enzymes that allow them to move between tissues (proteolytic enzymes).

They change their metabolism to survive in an acidic environment with a low intake of oxygen.

They are able to eliminate the proteins on the surface of their cell membrane so as not to be noticed by white blood cells and the immune system.

Could it be that all these complex processes occur with *the same characteristics, uniformly, in every person who suffers from cancer*, through random mutations?

Random mutations certainly have a role in the activation and development of cancer, but alone cannot provide a full

explanation of the problem. The probability that all these changes occur uniformly in all cases of cancer is simply zero!

An ancient mechanism reappears

A new theory put forward by Davies and Lineweaver completes the puzzle and allows researchers to follow new paths in their quest for greater understanding and, consequently, the achievement of better results in cancer therapy.

Their research adds new data and fills in the gaps left by internal Darwinism. They believe that cancer is the result of the activation of ancient, dormant cell mechanisms.

We know that inert genes are present in our DNA and that of animals. These genes contain information that is not used by our species; these genes are specifically suppressed by nearby genes, the so-called suppressors.

However, there have been cases of people who were born with tails, with membranes between their toes, with gills, covered with thick hair all over their bodies and supernumerary nipples. It is also known that mutant chickens can develop teeth and marine mammals can develop hind legs. These atavisms (the activation of primordial mechanisms) result from a malfunction of the genes that should suppress the expression of these mechanisms.

Man does not need a tail to keep his balance in trees. To the contrary, a tail might hinder survival. However, the

information for creating a tail still exists in our DNA. The reason humans do not develop tails, chickens have no teeth and marine mammals have no hind legs is because there are genes that suppress the expression of this information. It is estimated that these mechanisms were deactivated around 60 million years ago.

However, a mutation in the gene that suppresses their expression may result in the genetic abnormalities mentioned above.

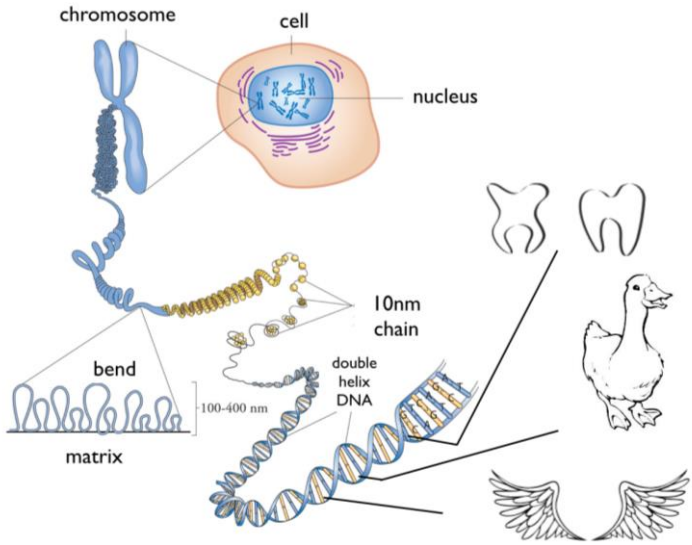

Figure 1/13 The DNA of every organism has "atavistic" genes, which are a legacy of the evolutionary past of the species. They are not expressed due to inhibition mechanisms. In the case of genetic mutations, however, these genes can express themselves once again. It is a current theory that cancer is the result of a similar mechanism.

A billion years ago, single-celled organisms that gradually began to organize themselves into multicellular groups prevailed on Earth. It was a state of liberal organization, far from that of today's complex organisms, which have specialized organs and systems.

Conditions on the planet were completely different (low concentration of oxygen and an acidic environment). These types of primitive organisms had a basic function similar to that of a tumor. Genetic information remained in DNA and is usually suppressed. However, when the survival of the organism is marginal or deviates significantly from the norm, these more robust, primitive mechanisms are activated and display a greater ability for survival in these conditions.

The result is cancer.

The new scientific stance differs because cancerous cells are not new and developed within the body as such, but conform a set of security mechanisms that guarantee basic survival.

The seemingly thin line that separates the two points of view uncovers new therapeutic paths. Now that we know that cancer cells develop in less than optimal conditions for the survival of the organism, it is easy to understand that destroying cancer cells to treat cancer is only a partial solution. The body must be brought as close as possible to functioning physiologically.

Cancer is "a symptom", rather than a "disease"

Cells begin their cancerous operation in an attempt to survive in a hostile environment. An alteration of the biochemical balance seems to be the main cause behind the onset of cancer. The unhealthy physical environment on earth threatens to completely destroy our cells, so they react by activating primitive mechanisms, which we call cancer.

Actions focused on improving our health and which help to maintain the biochemical balance can significantly reduce the occurrence of cancer. These can include:

- *Drinking plenty of water*. It is essential to the functioning of every cell in the body. All chemical reactions in the body take place in an under layer with an intracellular composition which is 70% water;
- Consuming an adequate intake of *antioxidant* foods. Antioxidants allow the prompt correction of cellular damage. They are spices, pure cocoa, organically cultivated coffee, berries, hazelnuts, almonds, walnuts, broccoli, organically cultivated fresh vegetables, colored fruits such as cherries and pomegranates;
- Consuming *foods that have not undergone artificial processing*, are close to their natural state and provide the ingredients necessary for cells to function properly;
- Consuming *fermented foods,* such as kefir, yogurt, cheese and natto, that help maintain a balanced intestinal flora;
- Remembering to *breathe deeply* often during the day, to improve the oxygenation of the body cells;

- *Adequate rest* and sleeping well and enough (7-8 hours) allow the body to correct any damage suffered during the day. More than 10,000 mutations happen every day in every cell of the body;
- *Exercising* at regular intervals improves the functioning of the lungs and the perfusion of the body. A large volume of scientific data proves that physical exercise is effective in reducing the risk of cancer;
- *Eliminating sugar* and similar substances (fructose, fruit juices, artificial sweeteners) from the diet. The only substance that cancer cells can metabolize as an energy source is sugar.

Proposed Supplements

Proposed supplements may have a preventative or adjuvant action in relation to conventional therapies in cases of illness. It is worth noting that, according to clinical studies, the administration of vitamin supplements and antioxidants in conjunction with conventional therapies (chemotherapy, radiotherapy) increases the effectiveness of these therapies and decreases their toxicity.

"It is worth noting that the administration of vitamin supplements and antioxidants in conjunction with conventional therapies (chemotherapy, radiotherapy) increases their effectiveness and decreases toxicity."

Vitamin D. Maintain optimal levels of vitamin D3 (between 50-80 ng/ml) throughout the year. Dosage: 2,000-10,000 iu per day

Natural multivitamin. This should provide a sufficient number of nutrients that are difficult to obtain through modern diets, such as all vitamins (including vitamin K2), fruit extracts, vegetable extracts, mineral salts in organic form, digestive enzymes and amino acids in free form (not as part of a protein) that can be easily assimilated.

Vitamin C is one of the most studied natural substances for its anti-carcinogenic action. It is selectively toxic to cancer cells, through various mechanisms. It has been proved that its effect is enhanced when administered in conjunction with lysine and proline amino acids and antioxidant polyphenols (natural antioxidants found in plants such as green tea, quercetin, lycopene and resveratrol). Dosage: 3-12 g per day.

Curcumin has strong antioxidant and anti-carcinogenic effects that have been documented by dozens of clinical studies. In order to achieve therapeutic levels in the blood, it should be administered together with the pepper extract called piperine, which increases its absorption by 2,000%. In such cases, the patient must be careful to take the supplements at least two hours after other prescribed medication, because it would also increase their absorption. Dosage: 2,000 mg per day.

Alfa Lipoic Acid. This is an intracellular antioxidant. According to Lester Packer, a professor at the University of California, Alpha Lipoic Acid is the perfect antioxidant. It enhances the action of other antioxidants and regenerates

vitamins C, E, coenzyme Q10 and glutathione (another of the most important intracellular antioxidants). Dosage: 600-1800 mg.

The amino acids glutamine, N-acetyl-cysteine and glycine are necessary for the formation of glutathione. Glutathione is the intracellular antioxidant par excellence.

Carotenoids are organic pigments with a strong antioxidant action that are not generally synthesized by animal species. Animals and humans obtain carotenoids from food. Examples of this type of antioxidant are lutein and astaxanthin.

Coenzyme Q10, especially in its active form, known as ubiquinol, in addition to a strong antioxidant action, also helps to create an intracellular environment that favors aerobic processes (chemical reactions that occur in the presence of oxygen). Cancer cells are favored by an anaerobic (without oxygen) environment, while the opposite is true for healthy ones. These processes occur in intracellular particles called *mitochondria*. Mitochondria are the energy factories of cells. Mitochondrial dysfunctions are associated with almost all chronic diseases and even with cancer. In 2007, it was discovered that mitochondrial alterations appear even ten years before the disease itself. Coenzyme Q10 is an essential element for normal mitochondrial functioning. In its active form, ubiquinol is absorbed 8 times more than ubiquinone, the non-active form, and is 90% more effective. Dosage: 100-300 mg per day.

Omega 3. A ratio of omega 3 and omega 6 that is close to 1 and an adequate intake of omega 9 (olive oil) inhibits

inflammation, regulates cell division, enhances the therapeutic effects of conventional therapies and prevents cachexia[4]. Dosage: 2-6 g per day.

Digestive enzymes. Digestive enzymes play a multifactorial role: they are necessary for the absorption of nutrients and serve as anti-inflammatory and anticancer agents. They must be of vegetable origin or swine, if they are of animal origin. Like man, pigs are omnivorous and have a large genetic affinity with the human body.

Broccoli extract displays significant anti-tumor, anti-inflammatory and antioxidant effects.

A better understanding of what causes cancer can significantly reduce the fear of becoming ill. Rather than hoping for good fortune in not developing "the disease", we can take concrete steps to improve our health.

Knowledge of the human body grows every day along with the ability to change what was hitherto incomprehensible.

Case study

S.G. 65 years old

S.G. when he came to see me, had just been diagnosed with colon cancer, with metastases to the liver, the abdomen and

[4] *Cachexia: a severe form of organic decay, characterised by a progressive deterioration of all the metabolic functions, leading to weakness, anorexia and weight loss.*

with concomitant lymphoma (lymph node cancer that affects a type of white blood cells, called lymphocytes) that affected the lymph nodes in the neck, abdomen and spleen.

His general condition, however, was excellent. He was lively, in good spirits, considering the circumstances, and was searching for a solution. His hematologist, a University professor and a childhood friend, had told him that it was a difficult situation, but not to despair, because during his career he had come to the conclusion that hope springs eternal.

A PET (Positron Emission Tomography) scan had shown all the active outbreaks of tumors. PET imaging is a technique in which the patient is administered a radioactive sugar. Since cancerous cells only metabolize sugar at high speed, they absorb it avidly compared to healthy cells. It is thus possible to see molecular and biological alterations, which often precede an anatomical alteration.

In addition to the professor of hematology, S.G. was also being treated by an oncologist (for the colon cancer and metastases) and now he also wanted me to become part of his team of doctors. I explained that I could help him in conjunction with the hematologist and the oncologist to help his body to better support the pharmacological, surgical and radiation therapies that he needed during his illness. Our therapeutic aim was to exploit the margin that these therapies would give us in order to restore physiological functioning. A goal that was challenging because the toxicity of the therapies themselves would be added to the already existing biochemical imbalance, which

had created the initial conditions that had caused the development of cancer.

I asked him if he had suffered any severe stress over the past three years and he said he had not, quite confidently. I tried to help him identify some stressful events, asking more specific questions about his job, his family, personal problems, relationships with friends, co-workers, legal and tax issues or the loss of a loved one, but he replied with extreme confidence that everything in his life was in order. I asked him to think about it and told him that we would have further opportunities to talk about the subject.

In addition to the blood tests that had already been done, I prescribed hormone and metabolomic analyses, together with measuring his levels of vitamin D3. The analyses showed that he had very low levels of vitamin D and had vitamin C, B-complex vitamin and magnesium deficiencies. He was under high oxidative stress (damage at cellular level that accumulates at a higher speed than that at which the body manages to correct them) and a significant mitochondrial dysfunction had also been highlighted.

I prescribed the necessary vitamins and supplements, accompanied by a diet tailored for his deficiencies and increased requirements and told him to come for a check-up after a month.

He returned a month later, with some recent CT test results. He had followed the regime of supplements, as well as the chemotherapy recommended by the oncologist and the hematologist. The results were impressive. All the abdominal lymph nodes, in the neck and the spleen had completely disappeared, the small liver injuries could not

be detected, while the larger ones had more than halved in size. The hematologist had been expecting a good response regarding the lymphoma, but the overall response and, in particular, that of the liver metastases was unusual.

I asked him how things were and he told me, with a sense of liberation, that after our last visit he had located and handled the main emotional stress factor in his life, that related to a family problem and changed significantly the way he saw things and problems in life.

Now that S.G. was no longer under continuous emotional stress, he followed the medical therapies prescribed for his condition and his body was given the necessary support to regain its optimal biochemical balance and continued to improve.

After four months, the only outbreak that remained was a small nodule in the liver and it, too, continued to decrease in size.

4 years later, S.G. is in excellent health, has regular check-ups and is treated by me and the other two colleagues.

For more information and references visit:
www.einum.org/150years

Chapter 14

Blood, human and animal cells contain a substance so important that life itself would not be possible without it.
Yet, over the last 30 years, we have reached a point where its name is akin to poison.
In this chapter, we will uncover one of the greatest modern myths about health.

Heart disease, Cholesterol and Inflammation

The issue of cholesterol concerns a large part of the population and for good reason, given that cholesterol levels are directly linked to cardiovascular disease.

Heart disease is responsible for half of all mortalities in Western countries and, unfortunately, the first symptom is sudden death in many cases.

Therefore, having a healthy heart is *vital*, by definition.

Over the past four decades, both doctors and the general public have been bombarded by data linking cholesterol to health problems, which relate mainly to the heart. At this point, two questions arise:

- Is concern about the levels of cholesterol going in the right direction?
- Could lowering cholesterol levels actually decrease the risk of developing heart disease?

How much truth lies in this argument? Even if it is regarded as a matter of fact, many scholars criticize the validity of cholesterol as an indicator of cardiovascular risk.

In the chapter on nutrition, we saw how the food industry and the Ministry of Agriculture of the United States presented data of the food pyramid based primarily on commercial interests, rather than on sound scientific data.

Modern marketing, in a manner that can only be described as genial, blends true data with other data that is merely "not false", reaching conclusions that are quite distant from reality.

To better understand how this can occur, it would be necessary to examine some of the factors underlying the design and results of scientific studies. Studies on different populations and groups can generate different results. Women over the age of 50, for example, do not benefit from drugs that lower cholesterol, while there is a major benefit for males under the age of 50, in cases where the disease has manifested itself. Therefore, a study of men aged between 35-50, with heart conditions, who smoke and have diabetes may produce results that do not apply to everyone. The same is true for women over the age of 50.

With reference to this group, a therapy may have a positive effect on heart attacks, but worsen or leave the overall mortality unchanged (i.e. mortality which results from other causes), which is the most important factor. It could, for example, be possible to administer a therapy which is effective in decreasing heart attacks, but which increases the incidence of death from liver cancer or from gastrointestinal bleeding and so on. Cases that highlight the benefit obtained in reducing heart attacks, without mentioning total mortality, which in many cases remains unchanged or worsens slightly, can lead to conclusions that are completely off the mark.

On the other hand, public relations departments can work actual miracles. For example, there may be 900 studies contrary to a therapy and 5 in favor. If the 900 contrary studies fail to be advertised or promoted and, conversely,

those 5 in favor are part of a huge advertising campaign, presented as almost miraculous results and announced in every major medical conference around the world, the resulting impression would be the exact opposite of reality. It would be as if the 900 had never existed, leaving all of us under the impression that those 5 represent reality instead. In this way, it is easy for both doctors and the general public to reach conclusions that are the complete opposite of the logical ones.

An interesting story

Having clarified the above, let us examine the history of cholesterol with a clear head. In the research I carry out to understand and separate true data from false and useless one, I always endeavor to find the original sources of basic principles for each topic, avoiding subsequent reports if possible.

As I start to examine in depth how a topic or theory was developed, I begin by evaluating all key data using the axioms of medicine and life. First of all, there is the "secret of medicine", which states that the body tends to find an equilibrium at the optimal health condition in any given time.

In this case, the assumption that fat is the cause of atherosclerosis was first coined by a German physician called Rudolf Virchow in 1856. Virchow noted deposits of

cholesterol in atheromatous plaques[5]. He was the first to suggest that high levels of cholesterol in plasma could be the cause of coronary heart disease. In 1913, Nikolai Anitschkow proved that subjecting rabbits to a diet with high doses of cholesterol caused damage similar to atherosclerosis.

Later, however, thanks to the discovery of the electron microscope, it was found that these lesions were not atheromatous plaques, but simple fat deposits. As can be seen below, atheromatous plaques are not simple fat deposits, but the result of an inflammatory process in the vascular wall. Rabbits, being herbivorous animals, could not metabolize the excess fat and accumulated it in the form of fat in all their vital organs. In addition, these deposits did not result in the complications observed in atherosclerotic plaques in humans; the cracks and fissures that cause heart attacks did not develop. When cholesterol was removed from their diet, these deposits regressed and disappeared. Conversely similar experiments carried out with dogs demonstrate the absence of these deposits, since their bodies are capable of metabolizing cholesterol.

[5] *Atheromatous plaques: degenerative plaques that constitute the typical lesion of atherosclerosis.*

A small town in Massachusetts

The Framingham Study is a milestone study on data regarding cholesterol and the risk factors associated to heart disease.

It all started in a small town near Boston Massachusetts, called Framingham. In 1948, the study and recording of the factors which affected the health of the population of this small town, 6,000 people, began and was called after the name of the town: the Framingham Study.

The aim was to monitor the impact that various risk factors (cigarette smoking, high blood pressure, nutrition) had in the advent of vascular disease (angina, heart attacks, strokes) in a controlled population. The results of this study have influenced modern cardiology like no other factor to date. In the years that followed, a variety of information which was published in major scientific journals was collected.

In 1979, researchers at the Framingham Study announced that the participants who had higher cholesterol values ran a slightly higher risk of developing cardiovascular disease. If high cholesterol values were accompanied by high blood pressure, cigarette smoking and problems with glycaemia, the risk became significant in people aged less than 50. However, in people over the age of 50, the opposite was seen to be the case. According to this research, as age advances, the link between high cholesterol and cardiovascular risk is no longer valid.

This research associated cholesterol levels with serious risks to health, both in the minds of scientists and the public. “High levels of cholesterol are associated with an

increased danger of obstruction of the vessels". The continual repetition of this message has stayed with us up to the present day.

"Repetition is the mother of all learning". Nowadays, in fact, we can state with certainty that the message has been learned.

A similar message, however, leads us to think that having high cholesterol is a very dangerous thing and that we should therefore strive to achieve the lowest possible levels at all costs.

Following this line of reasoning, it would appear that cholesterol is a *poison*. A toxic substance that circulates in our blood vessels which, when it accumulates beyond a certain level, clogs them with fatal results.

Is this true?

Cholesterol and Life

To best answer this question, it is necessary to understand exactly what cholesterol is. Cholesterol is a fat molecule mainly produced in the liver and is essential for the performance of multiple cellular functions.

Cholesterol participates in the formation and normal functioning of vital elements of the body, such as:

- Cell membranes;
- Nervous system;

- Production of a large number of hormones such as male ones (testosterone), female ones (progesterone, estrogen), cortisol and others;
- Production of energy, as fuel for muscles and, in particular, for the heart itself;
- Production of vitamin D.

Textbooks on human physiology tell us that cholesterol is one of the most important substances in sustaining life.

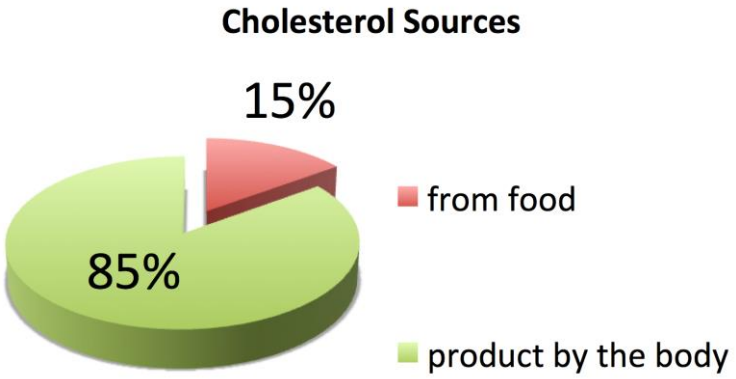

Table 1/14 85% of the cholesterol in the body is produced by cells. Only 15 % comes from food.

85% of the cholesterol that circulates in the body is produced within the cells, while only 15% is ingested through food.

According to the Harvard School of Public Health, contrary to popular belief, diets that recommend a low intake of fat lead to an increased consumption of carbohydrates, which worsens the metabolic profile, increase the levels of

glycaemia, triglycerides and insulin and result in serious damage to health.

The amount of cholesterol that we ingest through food has a minimal effect on its levels in blood. Several studies have repeatedly verified that diets with low or high cholesterol content have a minimal effect on its level in the blood.

We now know that subjects on diets that are rich in cholesterol see a rise at first, followed by a return to initial levels. The opposite was found with diets that are low in cholesterol.

It seems that the human body is genetically programmed to maintain stable cholesterol levels within a margin that is different for every single person.

Although there is currently no scientific data indicating what the ideal cholesterol levels could be, it is interesting to note that until the eighties, a level of between 150 – 310 mg was considered normal.

"A large quantity of new data indicates that high cholesterol levels are linked to inflammation."

In this context, why have increased cholesterol levels been linked to a higher risk of coronary heart disease?

What factors increase cholesterol, other than diet?

Cholesterol and inflammation

In a recent publication, Harvard Medical School revealed that approaching the issue of cholesterol as a "plumbing" problem, i.e. one that causes arterial clogging, was no longer valid.

A large quantity of new data indicates that high cholesterol levels are mainly associated with the presence of inflammation.

Inflammation is a term describing a set of mechanisms activated with the purpose *to repair* damaged tissue.

Upon tissue damage inflicted by mechanical, chemical, thermic factors and the like, the body triggers a specific repair mechanism to restore normal functioning.

Inflammation, therefore, is the response to an injury.

Interestingly enough, our perception is that inflammation is a problem when it is indeed a solution.

In most long-term (chronic) health problems when inflammation is observed, the factor that caused the tissue injury is no longer present or easily identifiable.

On other occasions though, it is easy to link an existing causal factor to inflammation, e.g., as you endure an injury playing football. The impact destroys tissues, which are then repaired through the activation of the inflammatory process in the affected area. There is swelling, redness, pain, heat and functionality is limited. These are the five classic signs of inflammation (*rubor, tumor, dolor, calor et functio laesa – redness, swelling, pain, heat and loss of function*).

After an initial vasoconstriction, which is observed at the moment of impact in order to limit possible bleeding, the blood vessels dilate (causing swelling) and a greater quantity of blood flows into the area (causing redness and heat) in order to facilitate the transport of nutrients. Pain has the aim of preventing the use of the affected part until it is fully functional.

The cause of damage is not always so obvious. Damage can be established gradually in the absence of direct impact or connected sharp pain. A common example is sunburn. We expose ourselves to the sun without feeling any pain in doing so. A few hours later, the skin becomes red, painful, it swells up, is warm to the touch and we need to limit our movements to avoid extra pain.

Under different circumstances, it could be possible to sustain damage over months or years. In that type of situation, it is not easy to identify the true cause when inflammation occurs. If a person smokes, they may suffer from bronchitis or other inflammatory diseases that affect the respiratory system years after they began smoking.

Over a long period of time, multiple factors could overlap, further complicating the situation. Among these, we should highlight:

- Nutritional deficiencies;
- Exposure to toxic substances;
- Ionizing radiation;
- Metabolic stress;
- Emotional stress;

- Stress of a physical nature (heat, cold, lack of rest);

Even if sometimes the impression is that our body has gone haywire, developing inflammations that we see as diseases, the truth is that *it always acts according to a logic which aids its survival.*

"Even if the body appears to have gone haywire, developing inflammations that we see as diseases, the truth is that it always acts according to a logic which aids its survival"

The body tries to find the best solution given the conditions and the resources available to it. We are the ones who presume to know more about it and believe that it tends to fall ill, while in actuality, it is trying to repair the damage sustained during its misuse.

Inflammation: a flawless process

During inflammation, the body activates very precise mechanisms:

- Initially, contracts blood vessels to reduce blood loss in case of hemorrhage;
- Activates clotting factors in the blood for the same reason;
- Immediately afterwards, there is a phase in which blood vessels dilate to promote perfusion, thereby providing

the affected tissues with the necessary substances for repair;

- Increases the presence of white blood cells to combat any microbial growth;
- Promotes cell division to repair and regenerate damaged tissues;
- *Increases the production of and, therefore, cholesterol levels in the blood to facilitate cell multiplication* and the mechanisms mentioned above.

In fact, above-normal cholesterol levels indicate that something is wrong with the body and needs repairing.

If a person shows cholesterol levels of around 250 mg, with no signs of inflammation and, after a period of time they increase to 290 and beyond, the real cause of this increase needs to be found and addressed.

An increase in cholesterol above levels deemed healthy is a sign of potential cardiovascular risk, rather than its cause.

"An increase in cholesterol above levels deemed healthy is a sign of potential cardiovascular risk, rather than its cause"

Likewise, white hair is a sign of old age and not its cause. What is more, white hair indicates that someone is becoming older (or has high levels of oxidation) and dyeing the hair does not make a person younger or healthier.

On the other hand, if the body needs cholesterol to repair and regenerate tissues, it might even be disadvantageous to drastically reduce its levels.

In fact, after 30 years of follow-up, data from the Framingham Study has linked low levels of cholesterol to a significant increase in both overall mortality and mortality resulting from vascular causes, especially after the age of 50. Several studies have shown that after the age of 50, low levels of cholesterol and LDL (bad cholesterol), in particular, are linked to an increased risk of cancer. We now know that the lower cholesterol levels become, the greater the risk of cancer.

Cholesterol levels are not a reliable indicator

A study by the University of California (UCLA) performed on over 135,000 people over a seven-year period, showed that *75% of those who have suffered a heart attack had normal levels of cholesterol!*

The same study showed that high levels of HDL (good cholesterol) and low levels of triglycerides are statistically correlated with a lower risk of suffering a heart attack.

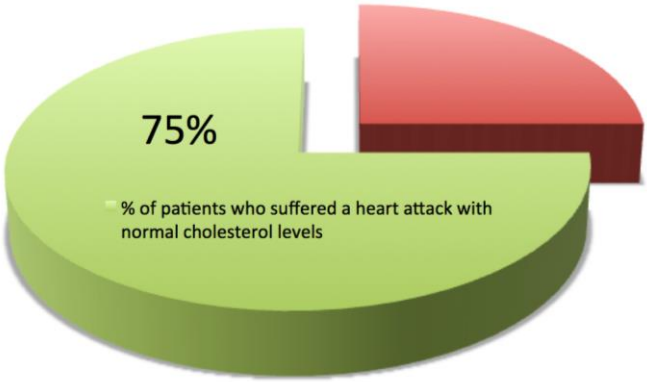

Table 2/14 UCLA (University of California) highlighted, in a study on 135,000 people over a 7-year period, that 75% of people who have suffered a heart attack had normal cholesterol levels.

These data are further validated by the cholesterol levels found in the populations of 15 countries and placed, on a diagram, in relation to the mortality rate caused by heart attacks in each of those countries, based on WHO data (see Table 3).

It is clear that cholesterol levels have not shown any kind of link to mortality caused by heart disease.

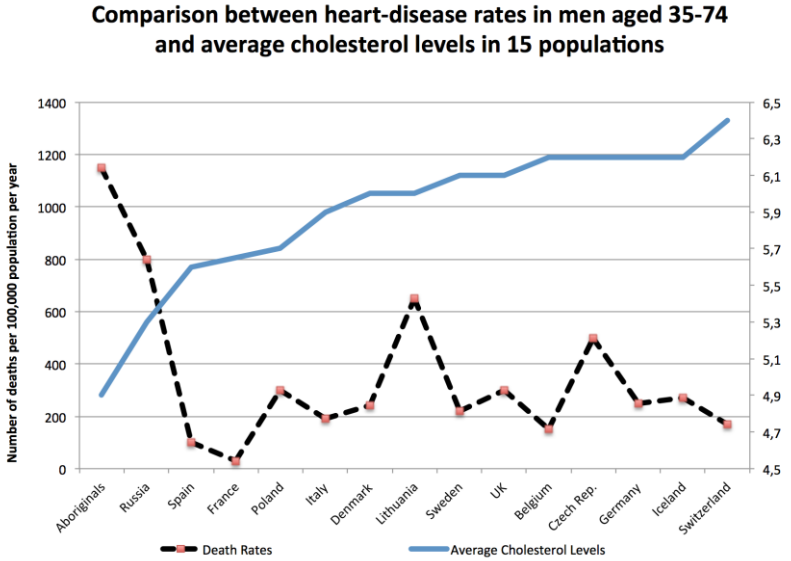

Table 3/14 Levels of cholesterol in various European countries in relation to the index of mortality caused by heart disease. It is evident that there is no relation between both curves (source: WHO).

How were current reference values established?

In 2004, a committee of experts (U.S. National Cholesterol Education Program) established guidelines, advising those at high risk of suffering from heart disease to reduce cholesterol to very low levels. Shortly afterwards, it was revealed that 8 out of 9 of the scientists who were part of the committee were in the payroll of the pharmaceutical companies the drugs of which they were trying to impose upon the general public, according these guidelines.

The lower "normal" levels are, the more people fall into the category that needs to receive pharmacological therapy. In 2006, however, a systematic review of the studies

performed, published in the Annals of Internal Medicine, highlighted that *there is insufficient evidence to promote achieving such low cholesterol levels*, and not even any evidence that could identify an optimal level.

In the same study, researchers noted that the benefits observed in patients on statin therapy were not so much due to cholesterol lowering, as much as to the beneficial action of this group of medicines, which was not linked to lowering cholesterol.

At this point, it is important to mention that, while the use of cholesterol-lowering medicines shows benefits in certain patient categories, this benefit is strongly refuted by a large part of the scientific community.

It is often said that scientific studies have shown a large reduction in cardiovascular risk for patients undergoing pharmacological therapy. Let us examine, for example, one of the most publicized studies in recent years, the ASCOT-LLA, carried out on 10,000 patients over a period of more than 3 years. Results reported in the newspapers spoke of an impressive 36% reduction in risk compared to those who took placebo.

In medicine, NNT (Number Needed to Treat) is an indicator that calculates how many patients need to be treated to obtain a benefit. Ideally, the ratio should be 1.

For example, if one hundred patients suffering from streptococcal tonsillitis were treated with antibiotics and 85 out of 100 showed an improvement in symptoms in 10 days, the NTT would be 1.17 for a cure lasting 10 days.

The ASCOT-LLA study showed that after *3 years*, cardiac events in the group taking the drug totaled 2 for every 100

patients, while it stood at 3 for every 100 patients in the group receiving the placebo. In this case, NNT was 100, which is an extremely high value. It means that 100 patients need to be treated for 3 years so that one of them may benefit from the therapy. Considering that there was no evidence of any beneficial effect on total mortality, and that these therapies last a lifetime, their use is disputed by many scientists and research groups.

In fact, a recent meta-analysis by the Cochrane Collaboration concludes that there are many flaws in the design of the studies regarding the use of statins, and suggests caution in prescribing them for primary prevention (to patients that have not yet suffered a cardiovascular disease as heart attack or stroke).

What happens if we lower cholesterol levels too much?

In this case, it is likely that rather unpleasant things happen to our health. As already mentioned, cholesterol is an important molecule for the performance of vital functions.

We are undoubtedly accustomed to hearing only bad things about it, but the truth remains that our body needs cholesterol to stay alive.

The cell membranes of all living beings formed by complex cells contain cholesterol. Life as we know it would not be possible if there were no cholesterol.

In particular, low levels of cholesterol have been associated with:

- Depression (cholesterol is related to the activation of serotonin);
- Hormonal and sexual dysfunctions (cholesterol is essential for the production of testosterone and estrogen);
- Neurological diseases (the brain contains ¼ of the total amount of cholesterol in the body);
- Low levels of vitamin D (vitamin D is produced by the action of the sun on a derivative of cholesterol and is perhaps the most important factor for our health. It is therefore highly undesirable for it to be lacking).

More reliable indicators

Cholesterol levels, when related to other indicators of inflammation, lead us to adopt a causal approach. A reliable indicator of chronic inflammation is **CRP (C-reactive protein),** which according the American Heart Association is used as a marker[6] to assess vascular inflammation and the risk of developing heart disease.

- CRP levels below 1 mg/L correspond to low cardiovascular risk.
- CRP levels between 1-3 mg/L correspond to medium cardiovascular risk.

[6] *Marker: a substance capable of revealing the presence of certain diseases or pathological conditions.*

- CRP levels above 1 mg/L correspond to high cardiovascular risk.

This partly explains why some people can have high levels of cholesterol and yet live to old age, while others, with lower levels of cholesterol, have serious heart problems and poor health.

A second reliable indicator of cardiovascular risk is **homocysteine**. This is a toxic product stemming from the incomplete metabolism of methionine (an amino acid). Its levels increase when certain B-complex vitamins (B6, B12 and folic acid) are absent, with increased oxidation, a lack of the amino acid called glycine, and an unhealthy diet.

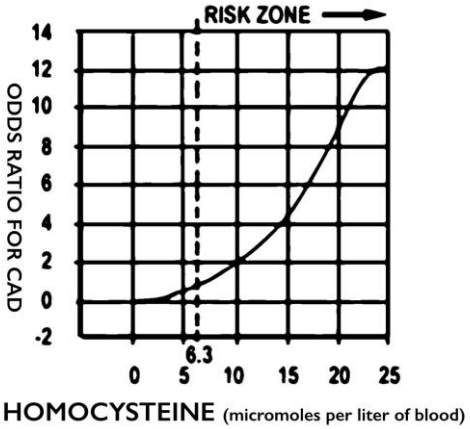

Figure 1/14 Homocysteine levels in blood (a toxic product resulting from the incomplete metabolism of methionine) is a good indicator of the likelihood of heart disease. (Circulation 15 Nov. 1995).

Ideally, homocysteine values in blood should be below 7-8 micromoles/L. Below these levels, risks associated with this indicator are almost nil.

The role of Vitamin C in atherosclerosis

Have you ever considered why atherosclerosis affects arteries (never veins) and in particular those that supply blood to the heart?

Arteries allow uninterrupted blood flow to the tissues because of their elasticity. Thus, inflexible arteries would only allow blood flow during cardiac systole. Because of their elasticity, arteries dilate and contract allowing a continuous blood flow.

However, this attribute results in repeated mechanical stress on the arterial wall. In particular, coronary arteries are those suffering major damage, as part of an organ which is also in constant motion. In each systole and diastole, the heart compresses and dilates coronary arteries. (Coronary arteries are so called because they wrap the heart like a crown. Latin *corona: crown*)

According to the theory of Linus Pauling, the only person who has won two unshared Nobel Prizes, and perhaps the one who has most studied vitamin C and its effects on health, unrepaired lesions on arterial walls are mainly caused by the lack of vitamin C and nutrients necessary to repair collagen and elastin.

Collagen and elastin are the substances forming the walls of blood vessels. Sufficient amounts of vitamin C, lysine, proline and zinc are required by the body for its production and continuous regeneration of arterial walls.

Until 1835, sailors suffered from complete ruptures of blood vessels due to the lack of vitamin C (did not eat fresh fruit while staying for months at sea) and died from

internal bleeding. The complete lack of vitamin C prevented the production of collagen and led to scurvy (Latin: scorbutus). The healing substance found later on was called a-scorbate (Greek: a- means non, thus what prevents scorbutus), also known as vitamin C.

The modern toxic environment dramatically increases our need for vitamin C. Stress, radiation, environmental pollution, heavy metals, and industrial chemicals represent a toxic burden on the body and significantly increase the need for vitamin C.

At the same time, the intake of vitamin C has been greatly reduced in modern diet. Eating fruits and vegetables is essential, but all processes these undergo before arriving to our table (hybrid species, growing on nutrient-poor soil, pesticides, and storage in refrigerators for extended periods before reaching the consumer) reduce their essential nutrients count.

Human species is one of the few on the planet unable to produce vitamin C and food intake is its only option to that end. Interestingly enough, animal species producing vitamin C endogenously (in the body) do not suffer from arteriosclerosis and heart diseases. Almost all animals produce 1 to 40 grams of vitamin C per day. As it seems, evolution and the abundance of vitamin C in the natural environment have led our species to stop producing the substance, while encouraging other metabolic processes to favor an increase in biological performance.

According to Linus Pauling, the minimum daily allowance to meet the basic needs of the body for vitamin C are of 2-3,000 mg for healthy people, and 5-6,000 mg for those presenting an increased risk of cardiovascular disease. At

this point, I would like to point out that an organic orange contains 55 mg of vitamin C if eaten with its skin and seeds within a few hours after picking, which is usually impossible.

Thus, modern humans suffer from a *chronic pre-scurvy* condition. This deficiency does not occur in a matter of months as sailors in the past, but over the course of decades.

Our bodies manage to repair to a certain extent the collagen and elastin of arterial walls. It follows that the body must necessarily use complementary mechanisms to stabilize vessel walls. One of the main support mechanisms is the deposition of cholesterol.

Thus, if our body lacks enough vitamin C, cracks begin to appear on the lining of blood vessels. Then, it signals the liver to produce more cholesterol to repair - even superficially - the damage. If the damage is too large, the amount of cholesterol deposited to repair blood vessels is proportionally increased. Blood vessels are clogged while coronary heart disease and strokes appear.

Calcium Vitamin K and vitamin D

A key factor concerning atherosclerosis is the presence of calcium deposits on cell walls. In addition to the deposition of cholesterol on the vessel wall due to unresolved chronic inflammation, calcium will also accumulate.

Progressive calcification hardens vessel walls (sclerosis means hardening) so that these lose their elasticity and ability to carry adequate blood flow to tissues.

In fact, a new version of Computerized Axial Tomography (coronary calcium scan), designed to quantify calcium deposits, proves one of the most accurate mechanisms to detect the presence of early heart disease.

New studies indicate that calcium is accumulated due to lack of mechanisms that regulate its transport and storage. Such mechanisms demand the presence of adequate amounts of vitamin K2, magnesium and vitamin D3. The body, upon deficiency of these substances, wrongly deposits calcium on tissues - instead of on bones - such as arteries, joints and other organs.

Clinical studies involving 4,800 people for a period of ten years showed that those among them with an increased intake of vitamin K2 presented lower cholesterol levels, decreased total mortality and a reduction in mortality rate greater than 50%.

What can we do about it

The cholesterol topic is part of a bigger picture. Instead of focusing our attention on reducing its levels in blood, which may be related or not to cardiovascular risk, we need to reduce factors likely to damage our tissues and thus trigger repair and secondary mechanisms, as well as those of inflammation.

Maintain an ideal weight, eat a healthy diet, exercise, decrease emotional and biological stress and provide our body with all necessary ingredients for optimal functioning: all these things will improve our health.

The solution does not lie therefore in preventing our body

from producing cholesterol, but in meeting the needs of vitamin C, lysine, proline and the micronutrients required for optimal operation.

Scientific studies have shown that after the administration of appropriate amounts of vitamin C, blood cholesterol levels decrease, vessel wall (endothelium) functionality improves and atherosclerotic plaques gradually regress.

Restoring normal cholesterol levels, which can be different for each of us albeit certainly not those established by the American advisory committee for cholesterol, as well as specially having a healthy cardiovascular system, demands:

- Meeting our micronutrients and mineral intake requirements.
- Sufficient vitamin C (3000-6,000mg) so that collagen production is guaranteed.
- Adequate amounts of lysine (2,000 mg) and proline (500mg).
- Sufficient amounts of vitamin K2 (90-1000 mcg)
- Maintaining a healthy bacterial flora. Vitamin K2 production is endogenous in the presence of beneficial bacteria in the gut.
- Significantly reducing sugar and refined carbohydrates (bread, pasta, soft drinks, potato) in the diet as these promote and predispose to inflammation.
- Exercising, even for a few minutes (12-15) 3 or 4 times a week, can help significantly.
- Increasing your intake of Omega-3.
- Optimizing vitamin D levels in blood.

- Taking antioxidants.
- Drinking lots of water

The cardiovascular disease problem is a lot more complex than checking mere cholesterol levels. Present knowledge permits us to act towards better health addressing the real causes of disease and not just markers or symptoms of it.

For more information and references visit:
www.einum.org/150years

Chapter 15

According to classic textbooks on medicine, diabetes could be cured in 90% of cases simply by changing diet and lifestyle.

However, the usual approach to diabetes, as a disease caused by an excess of sugar, does not seem to produce the desired results…

Diabetes is NOT a disease caused by an excess of sugar

Diabetes now affects 1 out of 11 Europeans. Approximately 75 million people suffer from this disease in Europe, while one in four adults find themselves in the pre-diabetic stage.

Diabetes is the most common metabolic disease and has reached such proportions only recently. The incidence of some types of diabetes *has increased by over 700% over the last 50 years!*

According to the endocrinologist Ron Rosedale, a researcher of disorders associated with diabetes, this observation inevitably leads to the following conclusions:

1. Given that the phenomenon has appeared in the space of a single generation, genetic causes cannot be the main reason behind this problem.
2. The problem concerns the radical changes in lifestyle and diet that have occurred over the last 50 years.

The shift towards an increasingly large consumption of refined carbohydrates and the production of highly processed foods have meant that our food is very low in nutritional value and provides a very high calorie intake. All this, together with a strong decline in physical activity, have taken our bodies to their biochemical limits.

The human body is genetically programmed to operate under specific conditions. In the modern era, however, we have completely changed these "use and operation" conditions, resulting in serious malfunctions i.e. diabetes.

Homeostasis

The body is a colony of cells. Over one hundred billion cells coexist, communicate and cooperate so that the miracle of the human body can exist. *Life is possible because of the ability of organisms to maintain a condition of homeostasis.*

The word "homeostasis" derives from the Greek "omoios" (same, unchanged, constant) and "stasi" (condition). "Unchanged condition" *describes the ability of living organisms to maintain stable internal environmental conditions (temperature, concentration of the various elements, etc.), despite external changes.*

When an organism maintains a stable internal environment, it is deemed to be healthy.

However, the inability to maintain homeostasis leads to sickness and this, ultimately, to death.

Two fundamental requirements must be met for this particular cell colony - known as the human body – to stay alive:

1. Cells must produce energy in abundance;
2. Cells must communicate amongst themselves to adjust their function in agreement with each other.

Glucose for Energy

Glucose is the key molecule used by our cells to produce energy. *Each food, regardless of class (fats, carbohydrates and proteins), once converted into glucose, is burned to release energy.*

The body continuously produces and transports glucose, *working hard to maintain stable levels of blood sugar while* making energy available to all its cells.

Sugar levels allowing optimal operation lie between 75-110 mg/dL. In other words, 4 liters of blood circulating in the body at any given moment hold less than one dissolved teaspoon of sugar.

Insulin and Leptin

Hormones are powerful substances travelling in the blood stream to regulate the function of various body organs and systems. *The two main hormones involved in the management of human body's energy reserves are insulin and leptin.*

While the role of insulin in the regulation of blood glycaemia levels is commonly known, the other functions it performs in the body are not, particularly its collaboration with leptin.

Leptin was discovered relatively recently (1994) and, together with insulin, is the main orchestrator of the endocrine system. Leptin is produced by adipose tissue. This makes body fat the largest endocrine gland in the human body. Under normal circumstances, leptin tells the

brain that we have eaten enough food so that we stop eating.

The role of leptin and insulin can only by explained by recalling their fundamental purpose. *For millions of years, the body has evolved in an environment of food scarcity.*

Environments with low food supply albeit demanding high physical activity make energy reserves the main regulator of body's functions at multiple levels. For instance, a body lacking energy reserves cannot guarantee the survival and growth of children. In these cases, the body prevents procreation through its hormones until energy reserves are replenished. In fact, fertility problems are not uncommon amongst people showing very low or excessive energy reserves (fat), such as lean (e.g., dancers, athletes) or obese persons were the leptin activity is problematic.

"For millions of years, the body has evolved in an environment of food scarcity"

Similarly, energy reserves help the body regulate the function of other glands and hormones: thyroid, testosterone, estrogen, adrenaline, cortisol and others.

In an environment of food scarcity, maintaining blood sugar levels becomes paramount. Blood sugar (glycaemia) would have a tendency to go down for most of the time. In fact, all hormones but for insulin increase blood sugar.

Now, therefore: under natural conditions, blood sugar levels would tend towards values below normal (75

mg/dL), together with low insulin values, while the rest of the hormonal system would work towards raising blood sugar levels.

Diabetes: a problem of communication

Nowadays, reality is the opposite of what was described above. Indeed, we live in an environment of ample food supply and very limited physical activity, where the high calories intake steadily drives up blood sugar levels.

The body, in an attempt to keep blood sugar within desired limits, secretes increasing amounts of insulin and leptin.

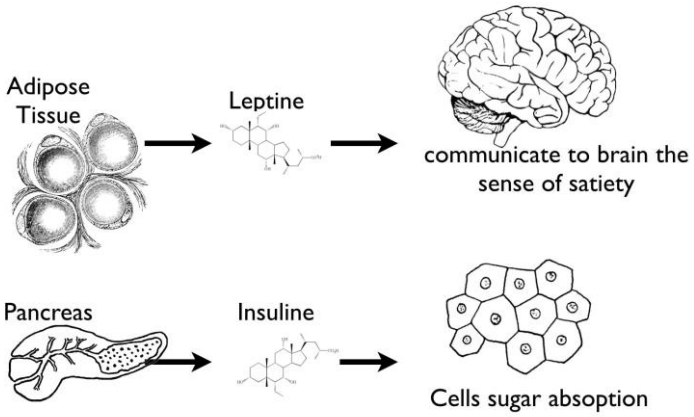

Figure 1/15 The roles of Leptin and Insulin inside the body. An excessive use of refined foods creates continuous high levels of leptin and insulin, which in the end, make cells "insensitive" to their stimuli.

The quicker food is absorbed, the quicker sugar levels in the blood rise and the greater the need for insulin and

leptin. The more food is refined, the quicker it will be absorbed and the more this hormonal imbalance worsens.

The body gets used to consistently high levels of these hormones and no longer responds the same way. Increasing amounts of insulin and leptin lead to ever-increasing demands for these hormones. This phenomenon is called leptin and insulin *"resistance".*

Eventually, the pancreas ceases to produce increasing amounts of insulin and the brain no longer responds to leptin signals. As a result, blood sugar begins to rise, while our brain no longer receives signals about energy reserves, and this drives to a further food intake increase.

Furthermore, the situation throws into disarray the entire hormonal system.

Such metabolic disorders underlie the following issues:

- Weight gain;
- Intense hunger;
- Increased risk of cardiovascular disease;
- Increased risk of cancer;
- Sexual impotence and erectile dysfunction;
- Susceptibility to inflammation;
- Hypothyroidism;
- Shortening of telomeres;
- Premature aging;
- Metabolic syndrome;
- Alzheimer's disease (Diabetes type III)

- Depression;
- Diabetes.

Diabetes and sugar

A unilateral focus on reducing sugar levels (glycaemia) in blood does not solve any of these problems, while health continues steadily to deteriorate.

We now know that most lesions are not caused by high levels of sugar in the blood, but by the high levels of leptin and insulin that occur many years before sugar exceeds 126 mg/dL, which classifies a person as a diabetic.

By the time diabetes has been diagnosed, damage to the coronary arteries (the vessels around the heart) has already occurred in 50% of patients. The main cause of this damage is not sugar, but rather the high levels of insulin that arise and stay high for many years before the advent of diabetes. Persons can find themselves in a pre-diabetic condition or metabolic syndrome (increased levels of insulin, increased levels of lipids and excess weight) many years before the appearance of diabetes.

"Thanks to metabolomics, it is possible to supplement the deficiencies that led to diabetes"

The assessment of the insulin and leptin levels, together with the measurement of other metabolic markers in urine and blood can provide a complete picture of the body's health at a given moment in time. Advanced, computer-

based technology applications can detect minute quantities of chemicals secreted through urine.

Any chemical reaction in the body produces a substance called metabolite. Through metabolomics, i.e. the measurement of derivatives of these reactions (metabolites), we are able to assess deficiencies in vitamins, minerals or other micronutrients with a high level of accuracy.

"There are frequent cases in which the secretion of insulin, even in small quantities, may suffice if cell sensitivity is restored"

Bridging these deficiencies can restore the organism to a state of health and significantly reduce the need for pharmaceutical support or the amount of insulin needed to regulate sugar. There are frequent cases in which the secretion of insulin, although insufficient under conditions of resistance, may suffice if its sensitivity and functionality are restored.

Diabetes is not only a problem related to sugar, but also hides a widespread metabolic disorder.

The overall improvement of the metabolic profile through:

- Balanced diet;
- Adequate physical activity;
- Specific supplements.

Can bring the body as close as possible to physiological functioning. By following this path, through my clinical

experience, I have seen that this is an attainable goal in 90% of cases, as reported in the classic textbooks on internal medicine.

Supplements

Diabetes is a health problem for which supplements can greatly improve the clinical picture and general state of health.

Given the multifactorial nature of this metabolic disorder, I can safely say that there is no magical substance that can resolve the issue. It is an axiom that applies to all health problems. Upon the onset of a disease, several metabolic pathways have already been altered. This is categorically true with diabetes, in particular. Therefore, it becomes necessary to adopt a comprehensive supplement strategy using the following substances:

- *Vitamin C*, of course, which has a predominant role due to damage at vascular level in patients who suffer from diabetes: 3-6 grams per day;
- Adequate intake of *lysine* and *proline* is absolutely necessary for the very same reasons: 2 and 0.5 grams respectively per day;
- *B-complex vitamins* are essential for carbohydrate metabolism: 10-50 mg per day;
- *Glutamine and Vitamin B1* help glucose metabolism and stabilize glucose levels in the blood, leading to the resolution of insulin resistance: Glutamine 5-10 g per day; B1 100-200 mg per day;

- *Alfa Lipoic Acid* is an intracellular antioxidant that improves glycaemia control, reduces the damage caused by diabetes at cellular level, helps to resolve leptin and insulin resistance and reactivates vitamins and antioxidants that have already been used: 300-1200 mg per day;
- *Magnesium* is absolutely essential for the reduction of insulin resistance: 150–600 mg per day;
- *Vitamin D3* must be maintained between 60-80 ng/mL;
- *Vitamin K2* decreases the risk of developing diabetes and improves insulin sensitivity: 45-180 mcg per day;
- *Chromium* increases the action and secretion of insulin: 200-400 mcg per day;
- *Cinnamon* helps to achieve better glycemic control and lowers the overall levels of glycated hemoglobin, triglycerides and lipids in diabetic patients: 2-4 g per day or extracts with an equivalent level of concentration;
- *Amino acids* are necessary for the production of endogenous antioxidants such as glutathione: Glutamine , Glycine and N-acetylcisteina;
- One of the most effective substances for the improvement of the metabolic profile is *water*. A dehydration level equal to 2-4% may decrease cellular energy performance by 40% and, essentially, undo all the beneficial actions mentioned above: 2-3 liters per day in relation to body weight are essential.

Case study

66 year-old E.C. was referred to me by her diabetologist. She had been under medical treatment with oral hypoglycemic agents for almost ten years, but during the last year, her blood sugar levels consistently exceeded 300 mg/dL. Her glycated hemoglobin had risen to 12% (glycated hemoglobin indicates the average blood glycaemia levels of the last 2-3 months, with normal levels being 4.3-6.2%). She felt tired all the time and very stressed. Of course, she had problems, but she believed that her emotional reactions were exaggerated compared to the problems encountered.

The diabetes specialist was recommending a switch to insulin injections, but she was firmly opposed to this treatment.

Carrying out a metabolomic profile highlighted significant nutrient deficiencies and it turned out that almost all the major metabolic pathways were obstructed. There was a high level of acidosis, serious mitochondrial dysfunction, an almost complete lack of B-complex vitamins and magnesium, an increased need for vitamin C, an alteration of bacterial flora and a decreased ability to metabolize carbohydrates, proteins and fats.

I explained to E.C. that, given the profound biochemical alteration observed, it would take six to nine months of therapy with proper nutrition and a precise regimen of supplements to achieve stable results.

I also stressed the fact that the more profound the metabolic alterations, the easier it is to achieve significant improvements. In fact, two months later, E.C. felt much

better. She slept and rested well, had more energy and her glycaemia was now consistently under 200 mg/dL.

Nine months later, her glycated hemoglobin was 6.5% and she felt reborn. Now we see each other just once a year for regular check-ups and she is very happy to have managed to avoid the insulin therapy.

For more information and references visit:
www.einum.org/150years

Chapter 16

Is it really enough to eat natural, organic and non-artificially processed foods to obtain the maximum benefits?

There are actually two additional aspects concerning human nutrition that could make all the difference...

The Ideal Diet - When and how much to eat to be healthy, lean and live longer

What diet would make us live healthier, longer and achieve our ideal weight? An ideal diet, in addition to these attributes, should also be easy to follow without the need for special efforts. Is there indeed such a diet? We all know that being slim and healthy takes a certain degree of suffering. After more than 25 years of research and clinical practice, I can confirm that there is a diet meeting these requirements. It has been tested in scientific research and clinical settings by distinguished research centers and applied in numerous clinical cases.

But first, lets review the different type of diets and dietary recommendations that have been found to benefit health and increase longevity.

Low-calorie diet

Since the thirties, we know that one of the best ways to extend lifespan through diet was caloric restriction in the absence of malnutrition. That means eating foods that provide fewer calories but contain high amounts of nutrients.

Research on humans and animals have repeatedly validated the beneficial effects of this type of diet. In studies in mice, it was found that a 30% caloric restriction could lead a 40% life extension. In human terms, those with a life expectancy of 80 years following a normal diet, could reach 112 years through caloric restriction.

It is estimated that over 100,000 people around the world follow this sort of diet. Blood tests and tests that measure biological age compared to chronological age, indicate that these people have a lower risk of severe cardiovascular disease and diabetes while experiencing better balance, memory and sight, compared with people of the same age who follow instead the common Western dietary habits.

Not everyone can nevertheless follow a diet so austere and, personally, I do not see it that compelling to live a long life of suffering due to food deprivation.

Periodic Fasting

Fasting has been used by man upon force majeure like food shortages, for religious reasons and also, as a form of medical therapy.

A type of fasting described and studied by researchers of the Institute on Aging of South California, shows significant positive effects in the short term. It consists in absolute fasting for four days. During four days, you can only take coffee, tea, water and a soup of 50 calories every night. The four-day fasting period should be repeated every two months. Changes obtained in blood tests in just four days, after such a fast, are comparable to those of the low-calorie

diet. Nonetheless, I believe that this solution is similarly intended for a selected few, because not everyone would be able to follow this regime.

Intermittent Fasting

In recent years, there is an approach that has attracted growing attention from researchers and, as of late, also from the public: Intermittent fasting. This method consists in alternating periods of relative fasting with normal meals.

There are several variations of this concept and, according to the studies published so far, all show positive results in terms of health, weight and longevity. A diet of this type is much easier to follow because there is no feeling of deprivation at any point.

One could eat moderately one day and to his or her heart's content the day after. This would be fasting every other day (1:1). For example, you restrict your intake, say to 25% of the Recommended Daily Allowance, one day and eat unlimited amounts of food the day after. It has been observed that, by following this sort of diet, one never eats 175% of the RDA on the "unrestricted" day. Usually, one consumes 110-120% thereof. In the end, therefore, this approach also leads to a reduced calorie diet.

With the diet referred to as 5:2, one fasts two days within a week and eats well for the remaining 5. This is one of the most common variations, which became known to the public after an excellent documentary by Dr. Michael Mosley, filmed by the BBC under the title "Eat, Fast and Live Long".

The Ideal Diet

In my clinical experience, however, the regime that proves easier to follow and yields the best results is the daily one. Intermittent fasting can also be applied within a day. The aim would be to introduce a 16-18 hour period of fasting, including those of sleep, and eat what you should eat for the day within 6-8 hours.

For example, you could have the first meal of the day at noon with a light lunch, take a snack between 3-4 in the afternoon and eat the main meal of the day around 7-8 in the evening. With this kind of diet, eating natural food with high nutritional content helps you perfectly align with the autonomous nervous system that regulates and controls body functions and hormone secretions. The body is programmed to find food during the first part of the day and absorb nutrients during the second part of the day. It is much easier to resist hunger during the morning or at night, when hormonal secretions require rest and nutrients.

This type of diet contradicts the classic dietary advice, which prescribes small, frequent meals. While it is true that these kind of diets have helped many people control their feeling of hunger and lose weight, they present practical limitations. It is actually hard to eat a natural, nutritious and healthy meal every 2-3 hours especially for those who work and spend a lot of time away from home, besides the fact that not everyone will see the desired results.

Intermittent fasting in all its variations helps the body to function in accordance with its physiological hormonal programming. It creates a hormonal interval where basal

secretions of insulin and leptin are low, followed by a brief spike of these hormones that:

- favors metabolism;
- has a strong anti-aging effect;
- decreases resistance to insulin and leptin;
- favors fat metabolism;
- controls the feeling of hunger;
- fosters a sense of satiety;
- helps achieve an ideal weight;
- has an anti-inflammatory effect;
- favors optimal functioning of the endocrine system;
- optimizes the wake and night rhythm;
- decreases the risk of developing metabolic syndrome, diabetes, and hypertension;
- improves the lipid profile;
- decreases the risk of cardiovascular diseases;
- allows the occasional consumption of non-recommended foods without negative impact on the hormonal profile;
- aligns with the natural body functioning and provides a feeling of well-being and health.

Hormonal Mechanisms

The human body is genetically programmed to respond better to a dietary regimen of intermittent fasting. Until just fifty years ago, humankind lived under food scarcity conditions. Feeding was hard for the majority of the population on this planet. Food was sporadically available (unfortunately, finding enough food remains difficult even today for a significant proportion of humanity, about a billion people). Our genetics still fit this type of logic.

Our hormonal system is adjusted to produce a higher yield during the day while preparing to absorb nutrients, rest and procreate towards the evening. This is the so-called Circadian hormonal cycle, from Latin Circa Diem meaning around / during the day. Increased levels of cortisol, adrenaline and dopamine (stress hormones) provide us with the energy stimulus necessary, increasing the chances of finding food during the morning hours.

The levels of these hormones are higher early in the morning and gradually go down during the day.

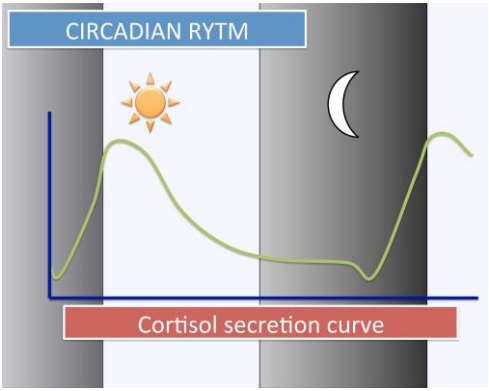

Figure. 1/16 Circadian Rythm and cortisol secretion curve.

Energy levels fall and other hormones, such as serotonin and melatonin, gradually take their place allowing us to rest, repair tissues and absorb nutrients from the food consumed.

The best time to eat our main meal of the day and get the most benefits is between six and eight in the evening.

Eating the main meal of the day within this time slot produces positive effect as regards the quantity of food consumed. This type of diet results in a lower food intake that is used with greater efficiency. Earlier in the day, the high stress hormones concentration allows us to better resist appetite and reduce our food intake.

Conversely, if we eat abundantly during the first half of the day, we will be still hungry in the evening. In the evening, resisting appetite is much harder than during daytime. This leads to large food intake in the evening as well. The more we eat, the hungrier we are ("Appetite comes with eating!"). In turn, this drives us to consume refined and high-calorie foods, resulting in increased insulin secretion.

To maintain sugar levels within the desired limits, the body is forced to release greater amounts of insulin and leptin, which are the main hormones regulating metabolism and energy intake.

In the end, insulin and leptin resistance develops (i.e. increasing quantities are needed to produce the same biological effect). In the end the feeling of satiety is lost and a body compulsion to eat constantly sets in.

Our body was adapted to survive in an environment of food scarcity. In the rare cases where this was available, insulin secretion increased the feeling of hunger in order to safeguard fat deposits for times of future need. Interestingly enough, the same mechanism that allowed our species to survive for millions of years among food shortages, is becoming our downfall in an environment where food is abundant.

High insulin levels block fat metabolism, produce weight increase and, therefore, pose a risk of chronic diseases such as cancer, hypertension, heart disease and diabetes.

Insulin and Longevity

Increased insulin levels are correlated with high levels of IGF-1 (Insulin-like Growth Factor 1). This growth factor favors cell replication. Increased levels of IGF-1 are observed during puberty and are necessary for body development. During the rest of life, however, having high IGF-1 levels favors premature aging, development of tumors and an exaggerated inflammatory response.

Researchers at the University Institute on Aging in California, using genetic engineering, created an extraordinary dwarf mouse that lives up to the age of 5 years. This equates a human longevity of 180 years. This animal was called Laron mouse and holds the record for longevity extension in mammals.

Laron mice are practically immune to heart disease and cancer and when they die, it is usually due to natural causes. The extraordinary thing is that scientists cannot find what causes their death. Their heart simply stops.

Laron mice were created in 1991 to allow scientists to study the homonymous Laron syndrome, due to genetic defect, which affects humans. Less than 350 individuals around the world suffer this condition. This group comprises individuals of short stature and an extremely low incidence of cancer, diabetes and cardiovascular diseases.

Whether humans or Laron mice, both share a dysfunction in the gene encoding the IGF-1. This also causes their short stature. On the other hand, they show better insulin sensitivity (the inverse of resistance) and, therefore, low values of insulin in blood.

Increased levels of insulin and IGF-1 continuously signal our cells to multiply quickly by shortening the length of their telomeres and, consequently, life expectancy. Studies of long-lived people also confirm that they all present low insulin levels.

Following the right diet

Another key element is the adequate type of diet based on our individual metabolic characteristics. Humans differ at metabolic level and different types of foods prevail in different parts of our planet. Eskimos and the Masai tribe in Africa, for example, eat mainly a protein diet from animal sources. In Polynesia, however, the diet has always been largely based on vegetables and fruits. In the Mediterranean region though is followed a diet based on foods with a wide variety of both animal and plant origin. It is noteworthy that all three populations, Eskimos - Masai, Polynesians and Mediterraneans, have low rates of cancer, heart disease and diabetes when they follow their natural diet while the opposite occurs when their diet deviates from it.

As early as the 30s of last century, Weston Price, with his extraordinary anthropological studies over the entire planet, discovered that there is no perfect diet for everyone. Due to the large climatic variations, ethnic, adaptability and availability of food, the human species has different needs and changes concerning nutrition. Roger Williams in the 40s was the first to observe that each of us may have a different metabolism, coining the term "Metabolic Individuality".

Some people feel good about eating salads and foods of plant origin, while others suffer from energy deficiency and insatiable hunger if eating anything other than meat. A portion of the population may follow completely vegetarian diets and feel well, while another part could follow the eating habits of a lion and remain just as fine.

Needless to say, there are endless variations between these two extremes, that is, people who feel the need and desire for food of both plant and animal origin at the same time. Therefore, we may distinguish three main categories of individuals, based on their metabolism and nutritional needs:

- Vegetable oriented;
- Protein oriented;
- Mixed.

Even if a person is mainly vegetarian, in certain conditions he or she may need foods and proteins of animal origin, as is the case during convalescence. Similarly, a protein-oriented person may feel better at certain times with increasing salads and vegetables in his diet, for example under intense stress.

Listening to your body

It is therefore necessary to listen to our body and consume the foods we long to consume. Whatever our category, we should eat foods in their natural form, organic and unprocessed. Artificially processed and refined foods disturb the balance of the hormonal system and screen messages and the true needs of our body.

The fact, however, that we crave foods that are not really such and have no nutritional value means that our hormonal system is severely disturbed. In this case, it is necessary to make substantial changes towards healthier choices, refraining as much as possible from them for a

period of at least six months, so as to restore the ability to perceive our real nutritional needs.

As one truly listens to and perceives the messages of the body, one suddenly perceives when is the right time to rest, drink water, eat something salty on a hot day, one knows that eating salad, vegetables or a nice steak would make him or her feel better. One accepts his or her body's cravings for nuts, fresh fish or fruits and one is able to identify something he or she ate or did that made him or her feel sick, tired, or caused a headache, heartburn and sore joints. Then, and only then, one could occasionally eat not so healthy food just for the freedom and pleasure of it.

The more a person restores his/her health condition, the more pleasure he or she will take in the things that make him or her feel good, and rejects the artificial and toxic things because he or she can easily tell the difference. Most of artificially processed foods contain substances - e.g., flavor enhancers - with direct action on the central nervous system (neuro-exciting toxins) that make us lose the ability to feel and taste natural flavors.

Unhealthy habits lead us to follow an increasing unhealthy lifestyle. Conversely, healthy habits allow us to re-establish communication with our body and take our health into our own hands.

Being healthy, lean and living longer is not a long process one must endure. When the correct data are available, it is a nice path that can free us from all sorts of suffering and allow us to truly enjoy the pleasures of life.

For more information and references visit:
www.einum.org/150years

Chapter 17

How safe are vitamins?

The Truth about Vitamins

One of the most confusing aspects of health for the general public and scientists, is that of safety surrounding the intake of vitamins and other micronutrients, including minerals and amino acids. These substances can be regularly found in dietary supplements but also in foods with the label “recommended daily intake”.

In my view, conveying a clear picture on vitamins and supplements demands answering the following questions:

- What is the exact meaning of “supplement”?
- Is it possible to exceed the “daily doses” or would doing so cause harm to our health?
- Can a vitamin overdose be responsible for a renal or hepatic function overload?

The history of the food model

Food model evolution was recorded and published for the first time by Dr Isabella Leitch in her review of 1942. This was the first time that the term RDA appeared (Recommended Daily Allowance) in a scientific publication. The first official provision concerning food was issued by the British Parliament in 1835. In particular, this recommendation was to add lemon juice to the sailor's diet as a preventive measure against scurvy. Nonetheless, the first real food recommendation was recorded during the economic crisis of 1862 by Dr Edward Smith, who had been

called upon by the Royal Council to determine the minimum amount of food that a person required to avoid starvation. Specifically, Smith measured the amount of exhaled carbon dioxide and nitrogen excretion in people working at the tread-wheel, a sort of treadmill used for forced labor in prisons; he estimated that the lowest dose of food for a male worker was 80 g protein and 2,800 calories per day. This was the first time a food model based on scientific measurements saw the light. During the nineteenth century, it was widely accepted that a diet including only the intake of protein, energy (fats and carbohydrates) and some minerals was adequate. We must wait until the twentieth century, in the light of new evidence, to understand that these foods contain essential elements that had not been identified. During the First World War (1914 -18), various proposals concerning the soldier's food ration were presented. At that time, it was discovered that soldiers fell ill due to nutritional deficiencies and that certain foods could prevent sickness: the so-called "protective foods". Subsequently, British authorities advised the addition of milk to the diet of children and green vegetables for all ages. With the Great Depression of 1929, special committees were created to collect information about the vitamin and mineral requirements of the human body. In 1933, it was described the first dietary recommendation that included values for various vitamins and minerals (Sherman-Stiebeling). In 1939, concerning the previous recommendation, Sherman stated that those minimum values should be increased by 50% to include even people who could not be covered by them. Finally, during the Second World War, further recommendations were formulated, which included more

minerals and vitamins to ensure the *minimum* nutrient intake under war conditions.

Current situation

We note that *all these recommendations are minimum values* of micro and macronutrients to avoid starvation and diseases arising from nutritional deficiencies. Afterwards, these specific values were used as a basis for legislation in the field of nutrition and supplements. However, these were the minimum amounts required to keep a man alive in food shortage periods. In fact, current recommendations do not differ (sometimes have lower values) from those of 1933 (see Figure 1).

TABLE 1

Dietary allowances for adults[1]

	Stielbing, 1933, 1939	NRC, 1941	RDA 2011*
Energy, *kcal*	2810	2775	2700
Protein, *g*	68	66	56
Calcium, *g*	0.9	0.91	1.0
Phosphorus, *g*	1.22	—	0.7
Iron, *mg*	13–14	12	8
Vitamin A, *IU*	5800	4696	3000
Vitamin B_1, *IU*[2]	460	516	400
Vitamin C, *mg*	71	71	90
Riboflavin, *mg*	1.74	2.3	1.3
Nicotinic acid, *mg*	—	15.5	16
Vitamin D, *IU*	—	210	600

[1] Ref. 11.
[2] 333 IU = 1 mg.

* **Dietary Reference Intakes (DRIs): Estimated Average Requirements**
Food and Nutrition Board, Institute of Medicine, National Academies

Figure 1/17 An example of a table of recommended daily allowances for certain nutrients (RDA). These quantities are calculated from the studies of Stielbing, after the war, regarding the minimum quantities under which people would starve.

Today, we live in an era of unprecedented abundance (at least for a part of humanity) and ample food supply. The food supply is nonetheless virtually empty from a nutritional standpoint: it only provides harmful calories without even nearing the minimum amounts of required micronutrients. These deficiencies are largely to blame for the explosive increase in the incidence of chronic health problems, autoimmune disorders and general prostration of the population.

What is the natural diet of man?

"An intake of food supplements and a good diet have become a necessity nowadays to make up for the deficiencies of modern foods"

What were the levels of nutrients in food when man appeared on Earth?

The truth is that we have no answers to any of these questions, but we know for sure that our food is 10 times poorer than that of just thirty years ago. Taking supplements, along with a good diet, has become a necessity nowadays to make up for the lack of nutrients relative to the ideal quantities. According to new guidelines concerning public health, a daily intake of a good multivitamin complex and vitamin D is now necessary, as described by the food pyramid of the Harvard School of Public Health (as seen in chapter 9).

The safety of vitamins

In recent years, there has been a steady increase in scientific communications and information on the benefits to our health arising from vitamin and supplement intake (see vitamin D, vitamin K, CoQ10, antioxidants and multivitamins).

Still, questions about the safety of supplements persist in the minds of many people.

Will excessive vitamins overload my liver or my kidneys?

Is there a risk of developing allergies?

Should I stop taking vitamins at certain times?

Can my body get used to vitamins?

"Not only are vitamins and minerals not toxic, they are absolutely essential in allowing the body to expel the toxic load"

Regarding liver and kidney overload, the specific concern arises from the identification of vitamins as drugs. The latter, in fact, often overload the liver and kidneys because these xenobiotics must be eliminated from the body. Xenobiotics refers to chemical compounds that do not belong to the human body and which are therefore extraneous to life. These can be both water-soluble and fat-soluble, just like paint colors (watercolors/oil colors).

While water-soluble compounds are excreted by the kidneys directly without any further processing, fat-soluble compounds must first be converted into water-soluble and

then excreted. This process takes place mainly in the liver by a group of 500 enzymes, the P450. This conversion requires a large amount of vitamins and minerals. *Therefore, one can understand how vitamins and minerals are by no means a burden on the liver or the kidneys, but, on the contrary, both prove absolutely essential in allowing the elimination of toxic loads in the body.*

"Many people feel safe taking medication while they are afraid of the side effects of vitamins. The truth is that* there are zero mortalities due to vitamins, *while annual mortalities due to side effects of drugs are very high"

There are fat-soluble vitamins (A, D, E) which, although very unlikely, can accumulate in the body. They should be administered under medical supervision for high doses of therapeutic intake and with parallel measurements of the indicators, which show whether they are sufficient or still lacking. With regard to vitamin K, although fat-soluble, it has not been possible to identify a toxic dose. Toxicity through vitamin D is highly unlikely because we would need to take more than 50,000 IU daily to observe the first signs of toxicity after a few months! The same applies to vitamin E. Vitamin A is limited to less than 10,000 IU per day during pregnancy and it seems that beyond a certain limit, it reduces the effectiveness of vitamin D. That is why the major vitamin producing companies have removed or dramatically reduced the amount of vitamin A contained in multivitamins.

It is remarkable that many people feel safe taking medication while they are afraid of the side effects of vitamins. The truth is that *there are zero mortalities due to vitamins, even after deliberate attempts of self-poisoning,* while annual mortalities due to side effects of drugs taken correctly are 106,000 in the U.S. alone among hospitalized patients.

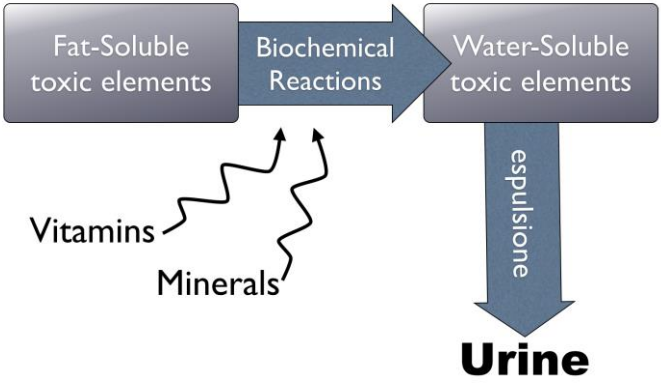

Figure 2/17 Vitamins and minerals are essential components in the elimination of fat-soluble toxins. Thanks to them, the body can transform these toxins in water-soluble substances and then excrete them through urination.

When we talk about vitamins and micronutrients, it should be clear that these do not include supplements and hormones occasionally used to improve athletic performance. The latter consist of pharmaceutical compounds and not of components *supplementing* our diet. In fact, these compounds are associated with health risks.

On the contrary, according to data published in the U.S. by the CDC, not a single death was reported in 2010 after 60

billion doses of supplements yearly and the same goes for the last 27 years until 2010. According to the Council for Responsible Nutrition, nutritional supplements are safe, effective and monitored by the respective government agency in each country.

Identification of nutritional deficiencies

The rapid development in the field of laboratory testing allows conducting metabolomic analysis at a cost comparable to a regular check-up. The information supplied to the doctor through similar analysis has multiple uses and provide the needs of a single person at that time. These analyses allow the prescription of vitamins and other micronutrients safely and in accordance with the deficiencies of each individual (personalized medicine).

The application of these techniques on an increasingly large-scale will fundamentally change the way in which we see prevention and treatment today, allowing intervention long before symptoms appear.

Imagine a widely oriented medical approach to identify causes rather than simply alleviating symptoms.

For more information and references visit:
www.einum.org/150years

Chapter 18

Sometimes, what we believe to be the problem is actually the solution…

The Stages of Healing

As mentioned several times in this book, the cornerstone of medicine lies in the fact that the human body has no tendency to express disease. Instead, it tends to maintain a steady operational state called homeostasis.

Contrary to what we usually think, the human body, and that of all living beings, is prone to equilibrium versus the best health condition possible.

Factors of a different nature can however unbalance this condition and threaten our health. These are called "stressors" and can be:

- Biological: infections, deficiencies of vital elements, lack of rest, dehydration;
- Chemical: toxins, heavy metals;
- Mental: anxiety, loss, problems in life;
- Physical: cold, heat, radiation;
- Mechanical: impact, traction.

In all these cases, the human body always tries to achieve a condition of homeostasis, much like a spring that is compressed and then released.

Under normal conditions, the automatic regulation implemented by the autonomic nervous system (ANS), together with the hormonal system, help the body display greater efficiency and energy levels during the day, whereas the evening is largely devoted to digesting, absorbing nutrients and repairing.

A graph representing the ups and downs of the circadian cycle would result in something similar to a sinusoidal curve (see Figure 1).

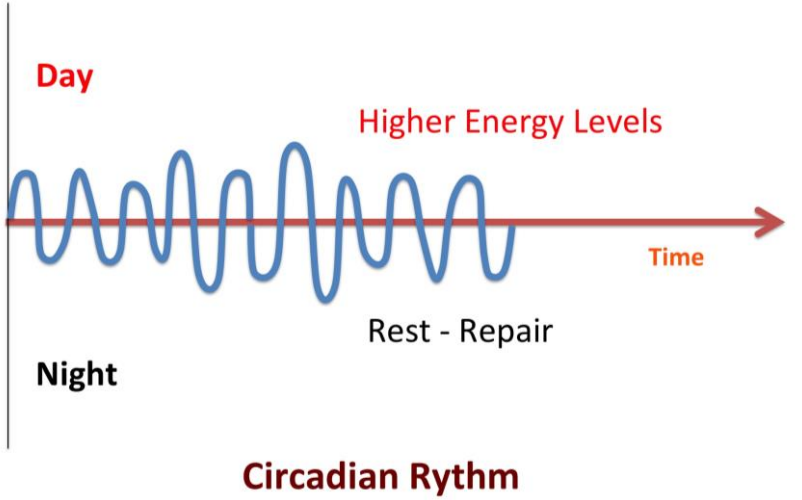

Figure 1/18 The body goes through cycles lasting 24 hours in which it has a higher energy efficiency during the day and an increased orientation towards repair and rest at night.

On the other hand, when the body suffers damage, it tries to restore the physiology (normal functioning) through a precise set of steps, and reorganizes itself to better withstand similar future efforts. For example, the callus that repairs a bone fracture is more resistant than the normal bone tissue that it repaired.

The intensity and duration of stress determine the intensity and duration of the repair. Our point of view also affects the result of the repair. If the stressor and symptoms of a repair are close in time, it is not a source of worry. It seems natural that muscles and tendons are inflamed and painful

even days after a physical effort that is considerably greater than usual.

In truth, when we train, we use these innate mechanisms to push the body to reorganize itself to higher levels of efficiency. When a person exercises, eats well (food and micronutrients) and gets adequate rest, the performance of his/her health and efficiency over time goes more or less as shown in Figure 2:

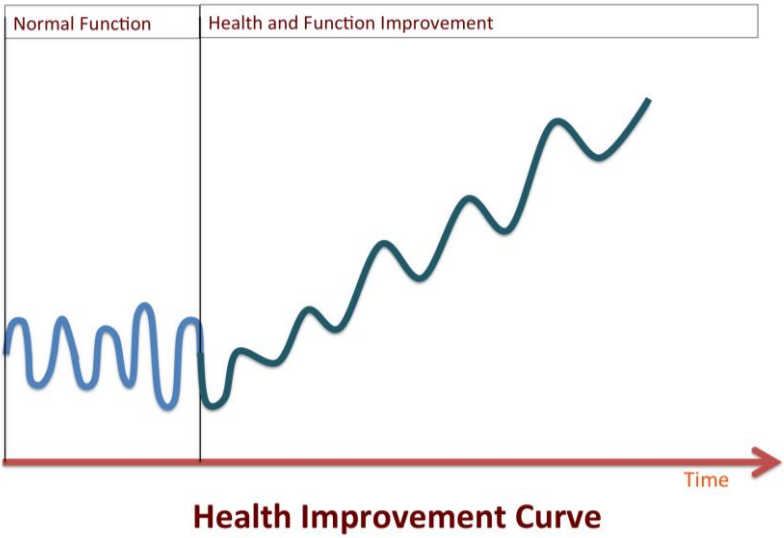

Figure 2/18 When we train, subjecting the body to greater exertions, providing it with adequate nutrition and rest, its condition improves because it is pushed towards greater levels of efficiency.

However, when a factor causes damage to our tissues and the repair takes place sometime later, as in the case of cigarette smoke, this mechanism is not clearly visible. It takes years for chemical damage to occur in the bronchial tubes before the body begins to repair the damage through

bronchial inflammation (bronchitis). This tiny, but continuous damage cannot be perceived at first. If you continue to smoke beyond this point, moments of repair and moments of damage alternate and the bronchitis becomes chronic. Each time this happens, however, the condition and functionality of the bronchial tubes will worsen because the damage is continuous and exceeds the rate at which the body manages to perform repairs. In addition to this, because of deficiencies of micronutrients that accumulate, each new repair becomes more difficult. In a similar case, the state of health of the bronchial tubes, though not limited to them alone, will appear as in Figure 3:

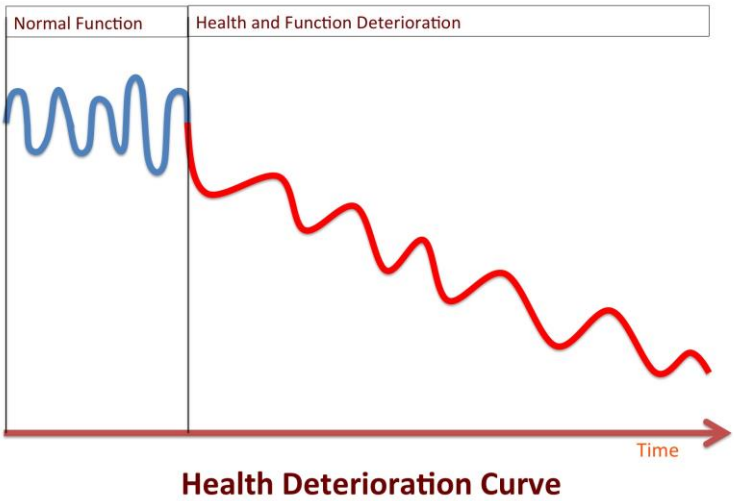

Figure 3/18 Health curve upon chronic tissue damage. It is a factor or harmful habit that causes damage faster than the body can repair it.

Ignoring why our health deteriorates brings forth mental stress, which complicates the situation even further.

Healing Stages

Any tissue, organ or the entire organism goes through a precise set of healing stages following a stress episode. Several schools and researchers have described this phenomenon, from traditional medicine, which describes wound healing (see Figure 4), to homeopathy which speaks of "therapeutic crisis". Also R. G. Hamer and Hans Selye, in their work on stress, mentioned these stages.

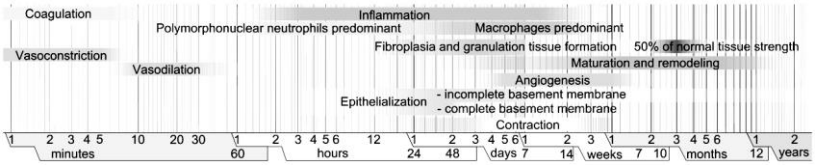

Figure 4/18 Healing stages that a common skin injury undergoes. In exactly the same way, internal tissues undergo similar healing stages that are typified by specific events.

The main healing stages are:

- *Damage* and activation of stress mechanisms;
- *Inflammation* and fluid retention;
- *Contraction* and expulsion of fluids;
- *Maturation and remodeling*;
- Gradual functional *restoration*;

Let us consider an example:

- Damage: A cigarette burns the skin. In that instant, blood vessels contract and the adrenaline released decreases local sensitivity;
- Inflammation: Dilation of blood vessels to increase the supply of blood follows. Blisters containing liquid appear

and the burned area appears sensitive and sore (pain serves to protect the area while it is being repaired, discouraging movement);

- Contraction: Blisters empty, releasing their liquid content;
- Maturity: Formation of a dry crust (scab) that protects the underlying tissues while they are being reshaped. The skin has improved, but is still not fully repaired;
- Recovery: The scab falls off, leaving a functional area with a slightly different color compared to the surrounding tissues. The body will continue the repair process until healing is complete, where possible under operating conditions.

Biochemical Stress

Living on this planet at this very moment makes us all susceptible to a very specific form of stress, one that underlies the vast majority of chronic diseases.

This stress is caused by nutritional deficiencies and hampers our functional efficiency. In turn, this efficiency shortfall is automatically compensated by stress hormones, enhancing the physiological curve of the circadian rhythm.

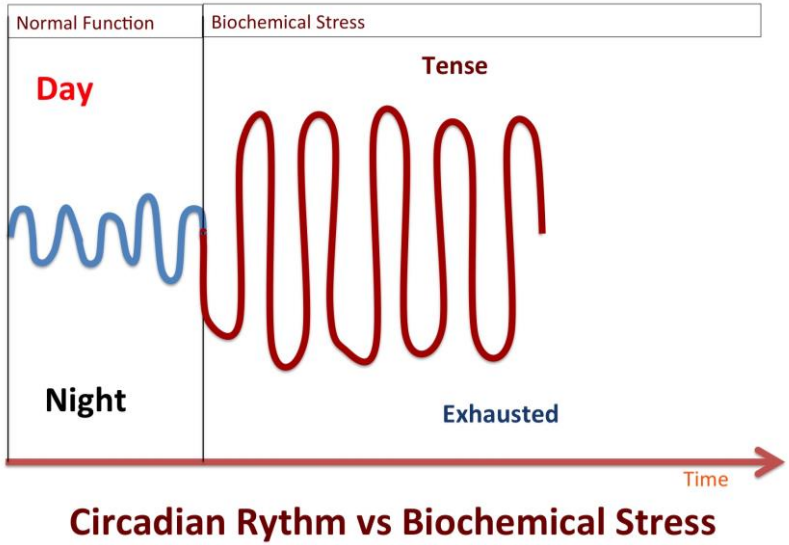

Figure 5/18 Because of nutritional deficiencies, hormones are forced to compensate for a lack of energy, enhancing the normal circadian cycle. Instead of alternating Higher Energy and Rest, the body switches continuously between Stress and Exhaustion and vice versa.

Someone operating under biochemical stress will not experience increased energy levels throughout the day. Instead, he/she will endure alternating tension and exhaustion episodes (n.b. being exhausted is not akin to being tired. Fatigue passes after adequate rest, whereas an exhausted individual struggles to rest well and fails to recover completely, even after having rested).

Consequently, as stress subsides through the administration of appropriate foods and the missing micronutrients, the body will try to restore a better health condition.

Before achieving this condition, however, it will go through different healing stages. It is important to bear this in mind as to support their progress towards healing instead of interrupting them.

Healing stages of Biochemical Stress

This section presents a list of healing stage symptoms, which begin when we correct nutritional deficiencies. They can vary in intensity (from barely noticeable to very intense) and nature according to case history, problem duration and affected organ or tissues. A person under biochemical stress will typically go through the following stages:

- Stress with symptoms that belong to both categories (tension and exhaustion), which in various combinations and depending on the tissues and apparatus concerned, may result in almost all known chronic diseases;
- Initial improvement following the correction of nutritional deficiencies. Average duration of one day to one month;
- Beginning of the reparative stage with decreasing levels of adrenaline, of other stress hormones (cortisol, dopamine) and the beginning of the reparative stage involving fatigue, increased need for rest, muscle weakness, vasodilatation (warm hands, hemorrhoids, a heavy head, dizziness), increased blood supply to the tissues, water retention, hunger and increased need for proteins that serve to rebuild tissue, inflammation (pain, itching, eczema, redness, swelling, chills, fever) and

constipation (increased nutrient and water absorption). Average duration of 1-3 months;

- Contraction stage involving increased urination, mood swings, interrupted sleep, cramp, arrhythmias, shortness of breath, difficulty breathing, panic attacks, asthma attacks, coughing and sneezing. Average duration of 1-3 weeks;
- Remodeling stage involving symptoms similar to those of the reparative stage, but less intense. Average duration of 3 months;
- Maturation stage, in which improvement continues until an ideal condition is achieved. Average duration of 1-2 years.

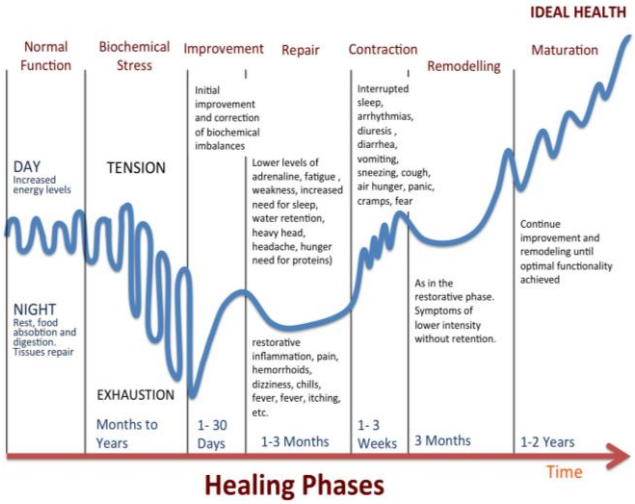

Figure 6/18 Diagram of the Healing Stages. As you begin to correct the deficiencies, there is an alternation of specific stages with fluctuating energy levels. It is important to recognize them as an indication of the treatment's success.

Understanding and recognizing these symptoms allows both doctor and patient to meet the body's needs while avoiding unnecessary complications arising from mental stress, which can adversely affect therapy and healing progress.

In addition, nutrients and medicines affect healing stages in different ways. For example, cortisone, antibiotics, painkillers, vitamin C, calcium and vitamin D decrease the intensity of the reparative stage. On the other hand, glutamine, magnesium and most of the B-complex vitamins promote repair mechanisms.

Metabolomic supplements, specifically designed with the help of metabolomics designed to correct micronutrient deficiencies and integrate this knowledge in their composition, may allow patients and practitioners to undergo such stages in a more efficient and easier fashion.

After applying these data to thousands of clinical cases, from those of a preventative and health improvement nature to desperate ones, I must admit that progressing through the stages is not always a light endeavor. On the other hand, this is not a magical solution and continuity and responsibility are required. Regardless, I can firmly claim that the application of this knowledge can dramatically improve our health condition.

For more information and references visit:
www.einum.org/150years

Chapter 19

There is something, which can promote health more than any other treatment…

Smiling for longer living

Can your smile foretell how long you will live?

Did you know that your smile can foretell how long you will live and your level of success in life?

Is it possible that something as elementary as a smile can have such a strong impact on all of us?

Absolutely!

Extensive scientific discoveries show that smiling has a direct influence both on our physical and spiritual condition.

According to Ron Gutman of Stanford University and a member of the scientific team at Harvard on new technological applications in medicine (the SMArt Initiative), the manner and frequency with which a person smiles largely determines the course of his/her life and health. Gutman has linked data from medical science, biology, sociology and neurophysiology to discover the hidden forces in smiles.

A 30-year study by Berkeley University examined the smiles in college photographs, and compared them with the path and the degree of happiness that these people had achieved in life.

The results of a study on baseball players' smiles in relation to the length of their lives were even more impressive. It was discovered that players who smiled the most in the photos had an average lifespan of 79.9 years, while those

who smiled less or not at all had an average lifespan of 72.9 years.

Our smile, however, seems to affect both our behavior and that of the people around us. Through his research, Gutman discovered that smiling is part of human nature, and that it can positively influence almost any social activity while making us feel good.

Gutman's findings are confirmed by the Harvard Medical School, where an article in Harvard Health Magazine, entitled "The link between happiness and health", states that scientific evidence suggests that positive emotions can help extend and make our lives healthier.

The smile is one of humanity's most important and frequently used tools of communication. New three-dimensional techniques allow us to observe the fetus smiling even before birth. More than 30% of us smile more than 20 times in a day, while less than 5% of us smile only 5 times a day. Children can smile up to 400 times a day! Have you ever wondered why you smile more when you are in the company of smiling children?

Two studies by the University of Uppsala in Sweden have shown that other people's smiles suppress de facto our control over our facial muscles and encourage us to smile. Researchers also noted that it is very difficult to appear miserable or frown when someone else is smiling. Smiling is contagious and gives us a strong subconscious impulse to smile ourselves when we see it happening.

According to Gutman, a single movement such as a smile can trigger a cascade of social, emotional, behavioral and

physical changes, which determine not only how we feel, but also how others see and judge us.

British researchers recorded the electromagnetic activity of the brain during a smile and have elegantly compared it to other pleasurable stimuli.

They found that a smile is equivalent to the stimulus of 2,000 chocolates or 16,000£ pounds sterling!

Scientific research shows that emotions not only determine the path to success and our health, but that *they can be shaped by our very selves*, regardless of how we feel and the prevailing conditions around us.

Put on your best smile. It might initially seem fake or nothing like a smile, but keep at it a little longer and observe your mood, your health and your life changing.

For more information and references visit:
www.einum.org/150years

Conclusions

The habits of modern life have created problems in managing the health of the human body. The same technology that gave rise to these conditions, however, has helped create a solution to the problem.

Thus, life expectancy can be greatly increased through properly formulated dietary supplements, metabolomics, weight control and adequate physical exercise.

I firmly believe that the mere fact of having a better understanding of your own body and its operation can have a striking therapeutic effect. What is more, I have seen it work in practice many times. It sufficed to explain to patients what their condition was for them to experience immediate relief.

It is nonetheless arduous for a person to change habits and lifestyle driven simply by fear or because it is a good thing to do. Even in such instance, changes will be temporary and possibly offset by fear, whose effects on health are devastating. Conversely, a person who understands how his body works makes changes that are driven by this understanding, because something that has been truly understood inevitably becomes a part of ourselves.

With this book, I have attempted to write a user's guide to the human body and convey my clinical experience. Health professionals who wish to go into greater detail, learn about how the body works and become certified by the European Institute of Nutritional Medicine, may do so by completing the Metabolomic Academy's online courses, which can be found at www.einum.org.

Feel free to contact me or my staff at the e-mail address: info@einum.org

For a medical appointment, please call the numbers available on www.drtsoukalas.com.

Should you wish to stay abreast of my articles and updates on metabolomics and nutritional medicine, or to find doctors and nutritionists that are certified by the European Institute of Nutritional Medicine, please visit the following websites:

www.drtsoukalas.com

www.drtsoukalas.net

www.metabolomica.org

www.einum.org

Now that you truly understand how to use your body, you can take your health into your own hands. I sincerely wish you a bright future full of health and happiness.

To your health!

Dr Dimitris Tsoukalas, MD

info@einum.org

Recipes

Yogurt

Yogurt is renowned for its excellent properties and mainly for the beneficial effect of converting lactose into galactose, which improves digestion and microbial flora of the intestine. Most of the yogurt on sale has been fermented for up to a maximum for 4 hours, so most of the lactose (70%) remains in the product, continuing to cause problems of indigestion for people who have difficulty consuming milk.

Fermentation lasting 24 hours, on the other hand, allows a complete conversion of lactose into galactose and the growth of billions of beneficial microorganisms that aid digestion, the bowel functions, the immune system and general health.

How to make homemade yogurt fermented for 24 hours

Pour 2 liters of whole or partially skimmed milk (preferably goat's milk and preferably organic) into a pot and heat it until you see the first bubble (90° C). Then let it cool down to 40° C. This temperature is reached when you can dip the tip of your finger in the milk and withstand the heat for 20 seconds.

Let it cool and mix it with 250 g of Greek yogurt (Total FAGE) in a glass or ceramic container. Leave it for 24 hours in the oven at 40 degrees and then place it in the

refrigerator. As soon as it has cooled, after about 4-8 hours, the yoghurt is ready to be consumed.

Whenever you remove a portion of yogurt to eat it, you will notice that the next time you will find a small amount of liquid in its place, which is also rich in good microorganisms and food proteins of a high nutritional value.

Kefir

Kefir is a natural probiotic derived from milk, like yogurt. It has a high nutritional value because its elements are fermented by the beneficial bacteria it contains. A glass of kefir contains 500 billion bacteria and more than 40 species of beneficial bacteria. It is one of the most effective means of restoring the functioning of the intestine and the intestinal flora.

It contains friendly bacteria, vitamins, minerals and proteins of high biological value. It is also a good source of calcium, phosphorus and magnesium, which contribute to the health of the nervous system, healthy cell growth, the proper maintenance of the body and the production of energy.

How to grow kefir at home

The right proportion of kefir to milk is 1:10. Put 50 grams of kefir “seeds” into a clean glass jar. Add ½ liter of cow’s milk, preferably organic or goat's milk (whole or skimmed)

and cover it. The jar must not be filled to the brim (up to 2/3rds).

Leave it at room temperature for 24-48 hours, away from direct sunlight. The more you leave the kefir "seeds" in the milk, the more viscous and acidic it becomes, the greater its strength and nutritional value. In general, it should not be left for less than 12 hours or more than 3 days.

Once this has been done, filter it using a plastic sieve, not a metal one, because with constant use, metal particles are deposited on the kefir "seed". The resulting liquid is the kefir drink.

Pour it into a glass bottle and store it in the refrigerator. The remains in the filter are the kefir "seeds" which can be used for subsequent crops. Using the sieve, rinse the pot and the kefir "seeds" with plenty of cold water that does not contain chlorine (filtered or bottled) and repeat the process from the beginning.

After each harvest, you will notice that the "seeds" are slowly increasing. The more "seeds" you use, the denser your kefir will be. Over time, you will have to increase the amount of milk or remove some of the "seeds", which you can give to someone else to cultivate.

The "seeds" must always be covered with milk. If you want to stop cultivating kefir for a few days, you can keep the "seeds" in the refrigerator in a small amount of milk diluted half-and-half with water until the next use.

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