

## II. | The Medical Breakthrough Towards the Natural Control of Cancer



## What you will learn in this chapter

- Cancer is no longer a mysterious disease. Its key mechanisms of development and control can be understood by everyone, without any special medical education.
- Cancer can be caused by many factors, but there is one common pathway via which all types of cancer cells spread: the digestion of connective tissue around the cancer cell.
- Overcoming the confinement by the surrounding connective tissue (e.g., collagen) is a pre-condition for cancer cells to grow, metastasise and to develop into a life-threatening disease.
- The mechanism by which cancer cells break this barrier is by producing uncontrolled amounts of enzymes, or biocatalysts. These small proteins function as 'biological scissors' paving the way for cancer cells to move through the body.
- All cancer cells, irrespective of the organ where they originate, use the same collagen-digesting enzymes.
- The more of these 'biological scissors' a cancer cell produces, the more aggressive and malignant it is, the faster it spreads and, generally, the shorter is the life expectancy of the patient.
- These 'biological scissor' enzymes are not confined to cancer cells. Already under normal (physiological) conditions cells use these enzymes to migrate through the body, including white blood cells (leucocytes), while defending our body against infections, and egg cells during the process of ovulation in the female menstrual cycle.

- Thus, cancer cells mimic and abuse natural mechanisms, already used by our body under normal conditions. But, as opposed to normal conditions, where the production of collagen-digesting enzymes is tightly controlled, cancer cells produce these biological scissors out of control and forever.
- This biological deception, the mimicking of normal biological mechanisms by cancer cells, is the reason why cancer cells are easily evading the defence system of our body – and why cancer is such an aggressive disease.
- Most importantly, we will learn that there are certain natural dietary molecules – micronutrients – which are able to block the biological scissor enzymes. Taken in optimum amounts these micronutrients are able to inhibit uncontrolled connective tissue digestion and the spread of cancer cells.

The information provided in this book is so basic and easy to understand that it will soon be part of biology classes in schools around the world.



## Let's have a first look at a cancer cell

Normally, the cells of our body are embedded in a network of collagen and other connective tissue molecules which keep them in place. For cancer cells to grow into a tumour and to spread throughout the body, they need to overcome this connective tissue confinement. In order to do so, every cancer cell produces 'biological scissors,' enzymes (or biocatalysts) that are able to digest the connective tissue surrounding the cancer cells.

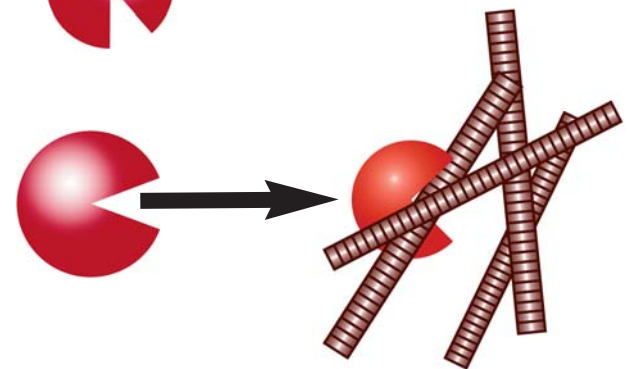
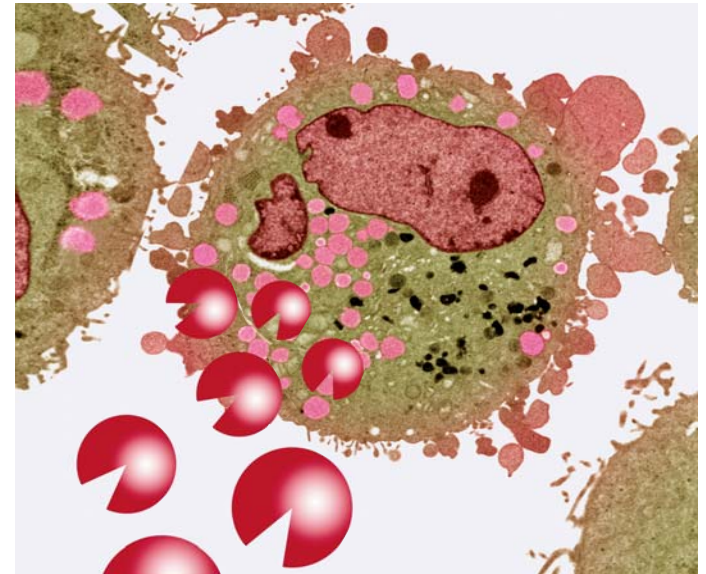
Cancer cells do not produce these destructive enzymes just for a short period of time, but as long as they live. Since cancer cells are by their very nature immortal, a growing cancer could be described as a disease that gradually digests the body from within.

The facing page shows the picture of a real cancer cell taken with an electron microscope, which magnifies this cell to 6500 times of its normal size. This type of cell is called a carcinoma cell, which means that it derives from epithelial cells, the type of cell that lines both the inner (i.e., lung, bowel) and outer (skin) surfaces of the body.

Under this high magnification we can clearly identify some of the characteristic features of all cancer cells: a) The huge, unusually shaped cell core (nucleus) reflecting a high multiplication rate of the cancer cells and b) the uneven, complex cell surface structure, reflecting a high activity of secretion of substances produced by cancer cells.

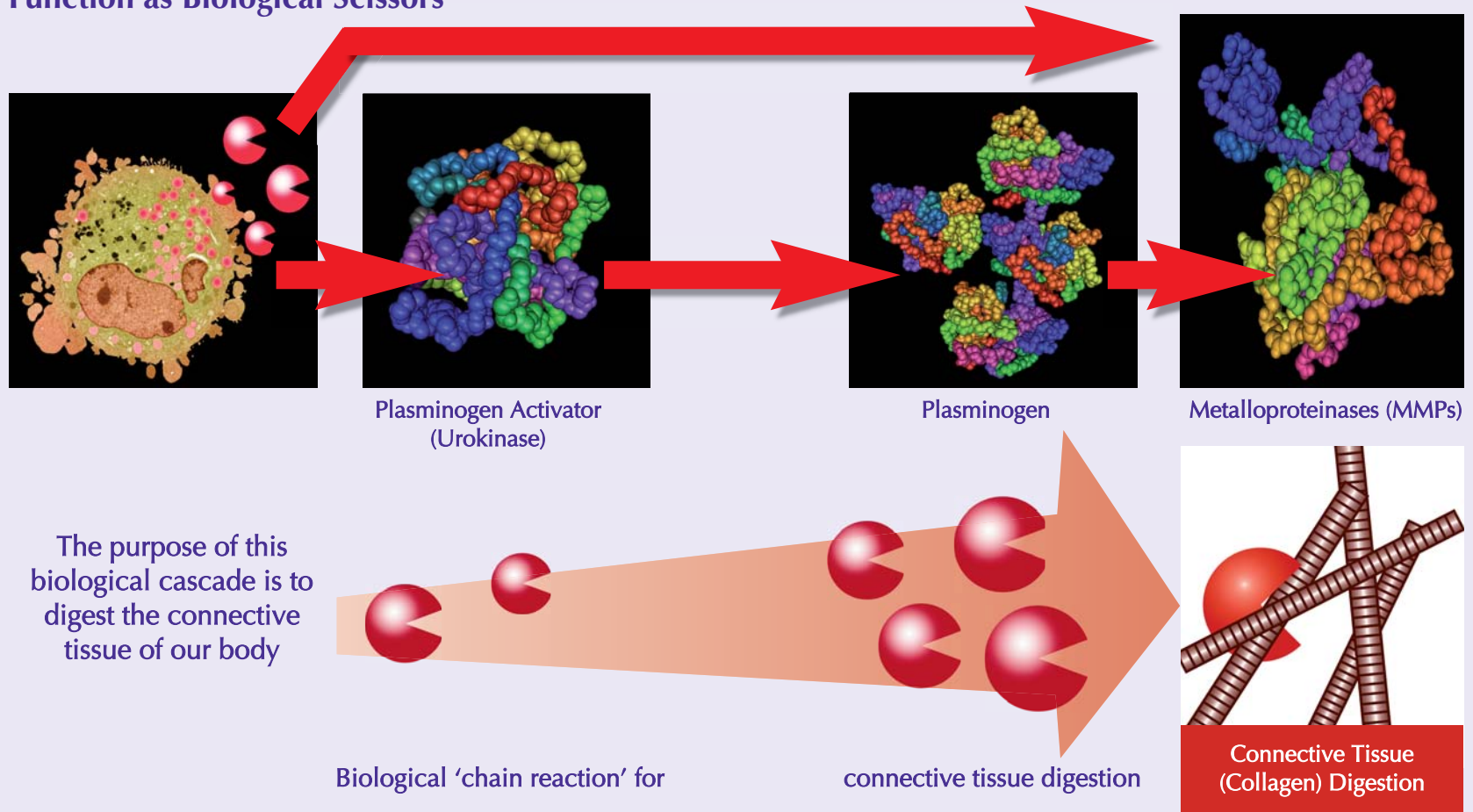
One of the most important molecules secreted by cancer cells in huge amounts are the collagen digesting 'scissor' enzymes. They are graphically added to this picture in the form of red 'pacman'-like structures.

### 'Biological Scissors' Enzymes Are Produced By All Cancer Cells





## Collagen-Digesting Enzymes Function as Biological Scissors



Of course, these 'pacman' structures in real life are biological molecules, proteins, that have the unique ability to chop up collagen fibers and other connective tissue molecules. The above picture shows that there is not just one type of 'pacman', but several

of them, such as Plasminogen/Plasmin and Metalloproteinases (coloured three-dimensional structures). To enhance their destructive effect, they can activate each other in the form of a biological 'chain reaction'.

## How Cells Move Through the Body

If we want to understand how diseases spread, we must look at the way healthy cells move through the body. This is easy to explain in the case of red blood cells; they are just carried along in the blood stream. However, it is more difficult to imagine how cells from other organs can move through our body and overcome the barriers formed by the connective tissue.

In order to move through the connective tissue, a cell has to be capable of temporarily dissolving the surrounding tissue – the collagen and elastic fibers – so it can make its way through. Cellular migration through dense tissue requires that these cells secrete enzymes – ‘biological scissors’ – that can dissolve the surrounding collagen. This is why these protein molecules are known as connective tissue dissolving enzymes, or in short: collagen-digesting enzymes.

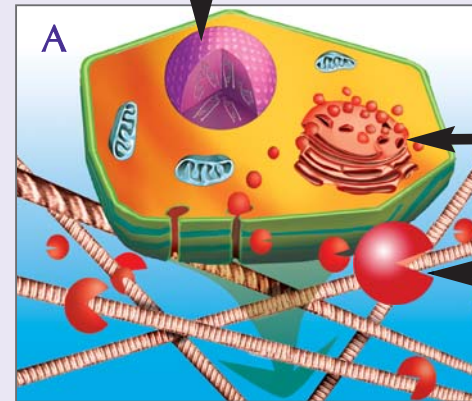
For easy understanding, we will continue to symbolise collagen-digesting enzymes as red circles or as a ‘pacman’ throughout the book.

On the facing page you see the production of collagen-digesting enzymes inside a cell (picture A). These enzymes are then secreted into the environment of this cell where they ‘attack’ and digest the surrounding collagen fibers. This process allows this cell to create ‘loop holes’ within the dense network of connective tissue and pass through it (picture B).

On the following pages we will provide you with some examples of how this interesting biological mechanism is being used in our body under normal (physiological) conditions.

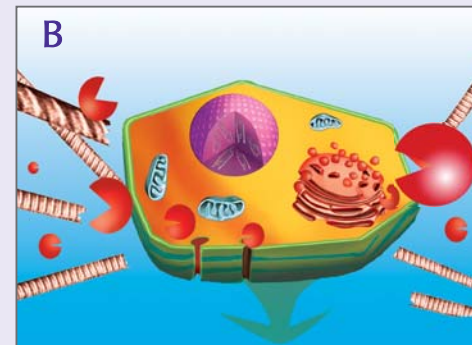
## Cells Move Through the Tissue and Organs of Our Body

Cell nucleus initiates the production of collagen digesting enzymes



Production of these enzymes inside the cell and secretion to the outside

Enzymes attack collagen and other connective tissue



The enzymes temporarily digest the connective tissue surrounding the cell, thereby paving the way for it to migrate through the body

## Collagen Digestion During Ovulation

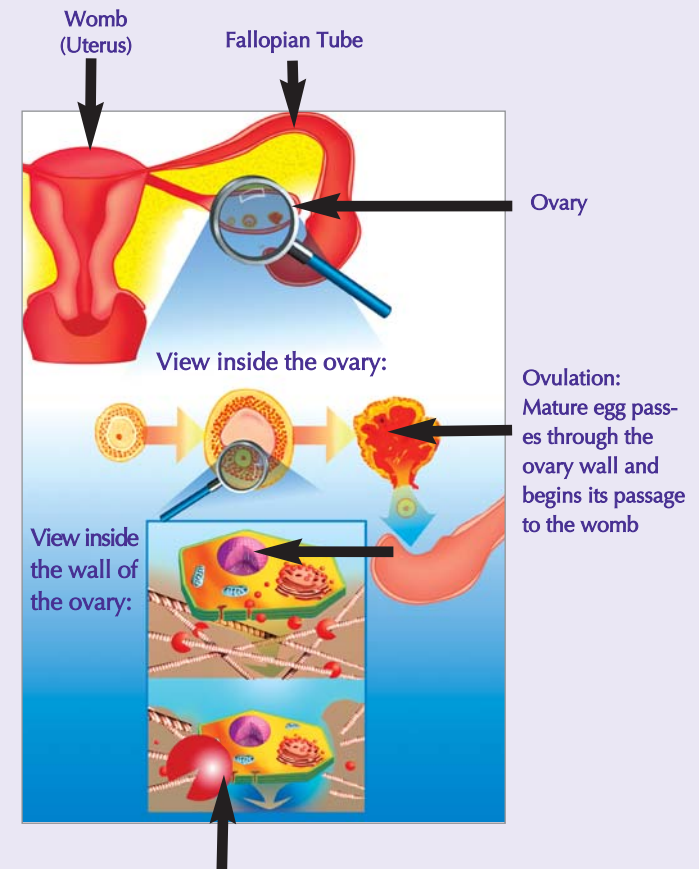
The process of ovulation in the female body is one of the most fascinating functions in which the body uses a collagen-dissolving mechanism. Monthly hormonal changes in the female cycle stimulate certain cell types (granulocytes) surrounding the ripening egg cell (follicle) inside the ovary.

Under hormonal influence (e.g., estrogen) these cells start producing large amounts of fluid rich in these collagen-dissolving enzymes. In the middle of the female cycle, the surrounding of the mature egg cell is so rich in collagen-dissolving enzymes that the collagen tissue of the ovarian wall loosens and forms a hole. This opening is just big enough for allowing the egg cell to move from the ovary through the small connecting channel (fallopian tube) into the womb (uterus).

It is clear that this mechanism needs to be precisely timed and to be confined to this specific location. This mechanism must let only one egg per menstrual cycle pass through and start its journey to the womb. Therefore, it is absolutely necessary that collagen-dissolving enzymes remain in a timely and physiological balance with the mechanism that blocks these enzymes and initiates self-healing of the tissue.

Immediately after the egg cell has left the ovary, the activity of collagen-dissolving enzymes is stopped by the body's own enzymatic blocks. This shifts the balance toward collagen-producing mechanisms, which dominate over the collagen-dissolving process. Using this mechanism the tissue of the ovary wall can quickly heal and close itself. Four weeks later, the whole process repeats.

## The Cellular Mechanism of Ovulation



Triggered by hormones, a temporary peak in the production of collagen-digesting enzymes 'opens' the ovary tissue for a few seconds – just enough time for the mature egg to leave the ovary and start its journey to the womb.

## A Closer Look at This Mechanism

We are aware that the comprehensive health information of this book may be a challenge. However, in order to understand the origin of diseases and how we can prevent them it is absolutely necessary to learn to 'think' at the level of cells.

For health professionals this may be easier because they are already familiar with processes occurring at the microscopic level. For lay persons this may be more difficult.

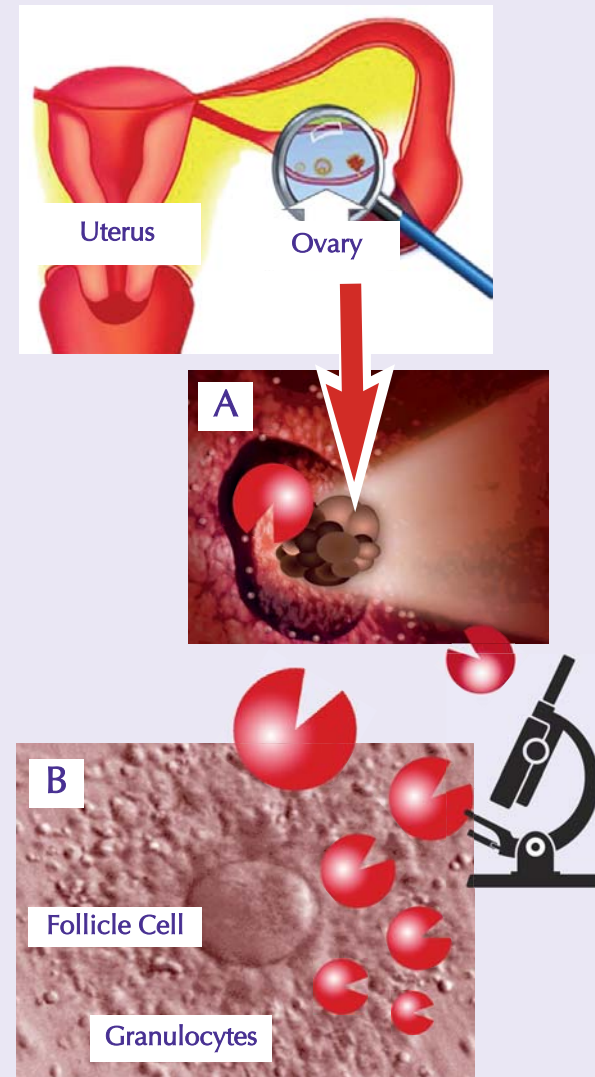
Since we want the information of this book to reach every person on this planet we will make a particular effort to illustrate and visualise this cellular level to our readers in an easy-to-understand manner. Throughout this book we will take you on a fantastic journey through the human body.

On the facing pages we start this journey by looking at microscopic pictures of the fascinating process of ovulation.

**Picture A** catches the moment when the mature egg cell leaves the ovary through a small hole biologically created in the wall of this organ. The collagen digesting enzymes (red pacmen) are added to illustrate this biological process.

**Picture B** shows an egg cell (centre) under a highly magnifying microscope. The small bumps surrounding this large cell are the cells (granulocytes) specialised in producing the large amounts of collagen digesting enzymes needed for ovulation.

## Collagen Dissolving During Ovulation





## Collagen Digestion During Infections

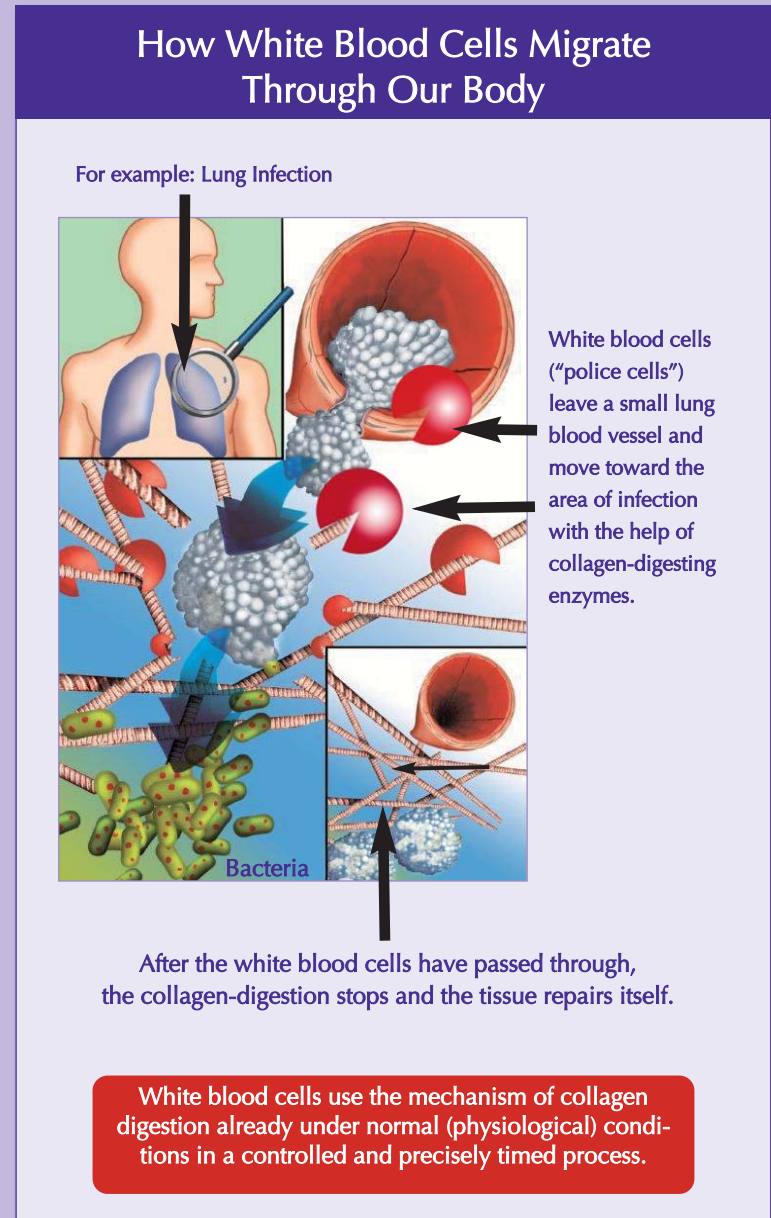
Another mechanism where collagen digestion plays a role is infection. The body's basic protection against invaders (microbes) is secured by the white blood cells. Several subgroups of white blood cells perform specific functions in the immune system, a sort of 'police cell'.

Especially important are the macrophages, which can 'eat' and digest invaders. Immature forms of these cells, called monocytes, can reach every part of the body through the blood stream. If an infection takes place in the lungs, the body releases 'alarm substances' that attract monocytes to the site of infection.

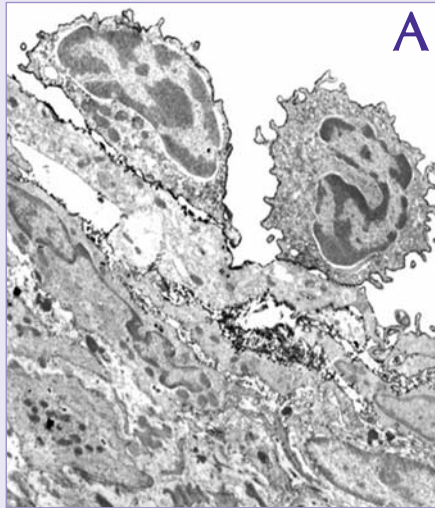
In case of a lung infection, the white blood cells, arriving with the blood stream, traverse the blood vessel wall of the small lung capillaries and move into the lung tissue with the help of collagen-dissolving enzymes. To reach the site of infection in the lung, (e.g., by bacteria or viruses), the white blood cells must be able to migrate through the lung tissue. In order to do so, they use the same collagen-dissolving mechanism, loosening the dense surrounding connective tissue and moving through the tissue much like an expedition that cuts its way through the jungle with the help of machetes.

Just as we have seen in ovulation, the connective tissue will close again right after the cells have passed through, using the enzyme-neutralising and tissue-repairing mechanisms.

This repair is assured by the optimal availability of 'pac men' –neutralising factors and of production of new collagen molecules.

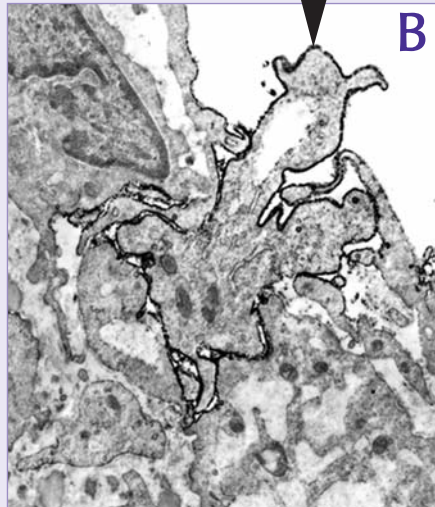


## Take a Microscopic View of How a White Blood Cell Migrates

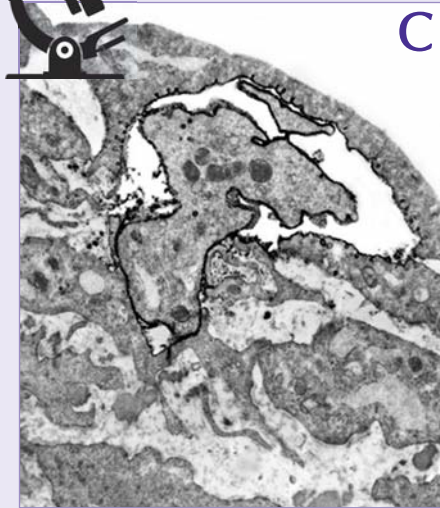


**A** a) A white blood cell from the blood stream (white area) attaches to the cell lining (endothelial cell) of the blood vessel wall.

b) The white blood cell leaves the blood stream and – with the help of collagen-digesting enzymes – it ‘squeezes’ its way inside the blood vessel wall.

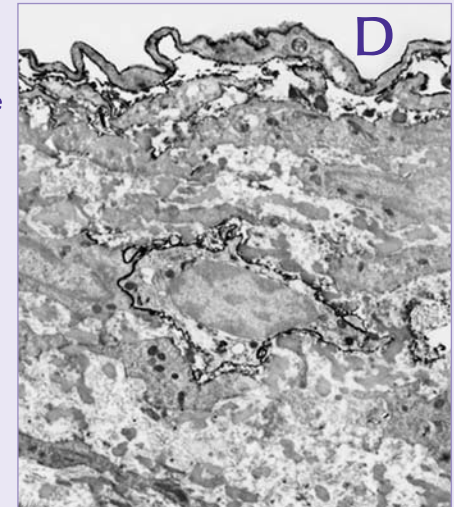


**B**



**C** c) The white blood cell now has entirely left the blood stream, the blood vessel wall has closed behind it.

d) The white blood cell has started its migration through the connective tissue and is completely surrounded by it.



**D**

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## Collagen Digestion in Tissue Remodelling

Another process where collagen-digesting enzymes are used under normal conditions are all forms of tissue remodelling processes. One such example is the preparation of the female breast for lactation, (i.e., breastfeeding).

At the end of pregnancy, and in preparation for breastfeeding for the newborn, hormonal signals 'tell' the cells of the breast to 'switch on' the production of collagen digesting enzymes. Just like a 'demolition team' in real life their job is to tear down the existing architecture of breast tissue in order to allow the reconstruction of the 'lactating breast' – and its adaptation for milk production.

On the facing page you can see under the microscope the dramatic architectural changes the female breast tissue undergoes from normal stage to lactating phase.

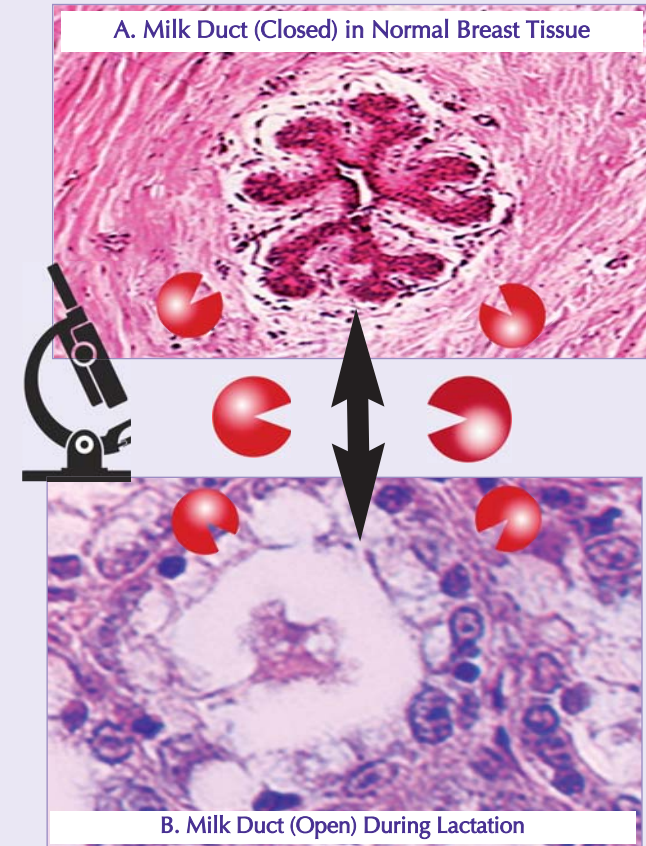
In **picture A** you can see the tissue architecture of a non-lactating breast, characterised by the dense structure of connective tissue surrounding a largely closed milk duct in the center of the picture.

In sharp contrast, **picture B** shows the cellular (histological) structure of a lactating breast, characterised by loosened connective tissue, the presence of prominent gland cells required for the production of milk (small white circles) as well as the widely open milk duct (centre of the picture).

Imagine the amount of collagen digesting enzymes required for initiating this process and the fascinating architectural blueprint to rebuild the breast tissue for each of these stages.

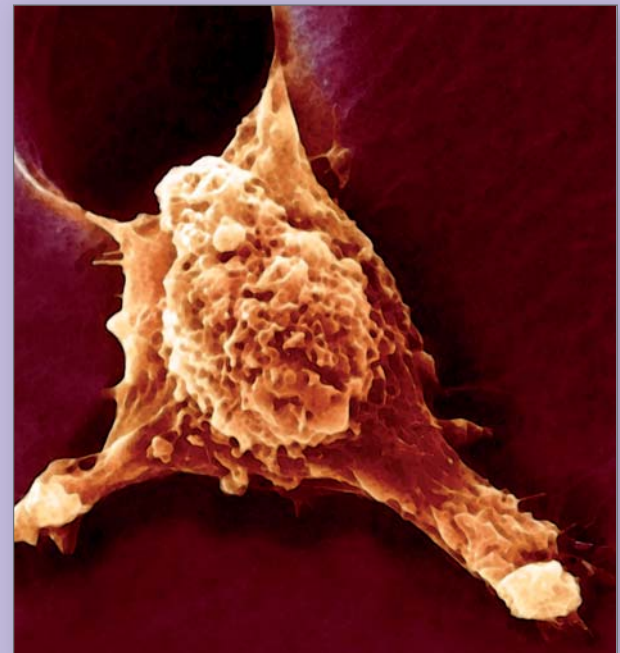
Other processes of tissue remodelling involving collagen-digestion include wound healing as well as body and organ growth.

## Collagen Digestion in the Breast



- A. Microscopic picture of a milk duct which is closed in non-lactating women.
- B. For lactation the breast tissue is restructured. The open milk ducts allow the flow of milk.

## Unravelling the Secrets of Cancer





## Unsolved Question No. 1: Why is Cancer Such an Aggressive Disease?

Despite the elucidation of some selected aspects, the fundamental nature of cancer has remained a mystery. Moreover, as long as the most basic questions in connection with cancer remain unanswered, there can be no effective cure.

This book provides answers to the most basic questions:

1. Why is cancer a particularly aggressive disease.
2. Why some organs in our body are more affected by cancer than others.

The facing page summarises the answer to the first question in graphical form. If a disease mechanism is being used already under normal, healthy conditions, the body simply has not developed any effective defences to counteract these disease mechanisms.

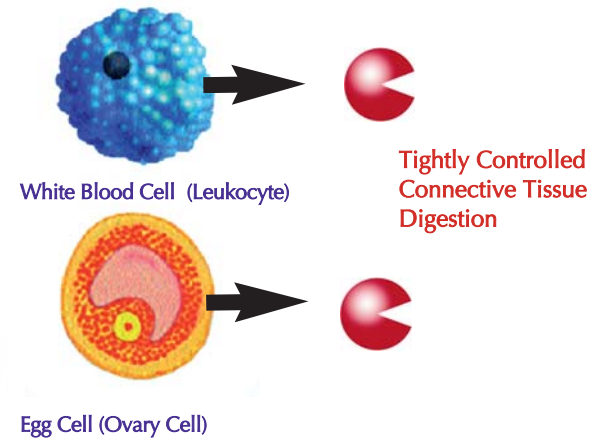
Since white blood cells, ovary cells and many other body cells already use the mechanism of producing collagen digesting enzymes under normal (physiological) conditions (A), cancer can spread in an uncontrolled fashion and uninterfered with by the body's defences (B). The trick is simple: Cancer cells hijack the very same mechanism that healthy cells use – but in an uncontrolled manner.

For the first time, we can now explain the aggressive nature of cancer. This new understanding points at the significance of specific disease mechanisms and, thereby, will lead towards an effective, natural control of cancer.

### Cancer Cells Abuse Natural Mechanisms of Our Body

A

Health (Physiological Conditions)



B

Disease, e.g., Cancer (Pathological Conditions)



*Unsolved Question No. 2:*  
**Why are Some Forms of Cancer  
More Frequent Than Others?**

The second question that has remained unanswered by cancer researchers and specialists (oncologists) until today is ‘Why are some forms of cancer more frequent than others?’

Our research has provided the answer to this key question too. Cancer develops particularly often in organs that use collagen digestion already under normal or physiological conditions. The first group of organs affected are reproductive organs. In particular female reproductive organs undergo dramatic and repeated functional (hormonal) and structural changes during their lifetime.

Earlier in this chapter we already discussed the profound changes in the female body during ovulation and lactation. In a similar way, the womb (uterus) and the cervix undergo tissue restructuring in connection with the monthly cycle and pregnancy that all require a high activity of collagen digesting enzymes. Not surprisingly, these organs are the most susceptible to connective tissue digestion going out of control – and, therefore, most prone to cancer.

For the very same reasons, the reproductive organs of men, the prostate and testes, are also frequent sites of cancer development.

Another factor is of particular significance: Both female and male reproductive hormones are known to stimulate the production of collagen digestion enzymes in reproductive organs. Elevated levels of these hormones – either by increased production in the body or from hormonal drugs (contraception, hormone replacement) increase the risk for reproductive cancers.

Cancer in Reproductive Organs	
	Collagen Digestive Enzymes Used Under Normal Conditions
Breast	Lactation
Ovary	Ovulation
Uterus	Pregnancy
Cervix	Conception
Testes	Sperm Production
Prostate	Sperm Fluid Production

## Why Some Forms of Cancer Are More Frequent Than Others: Bone Cancer

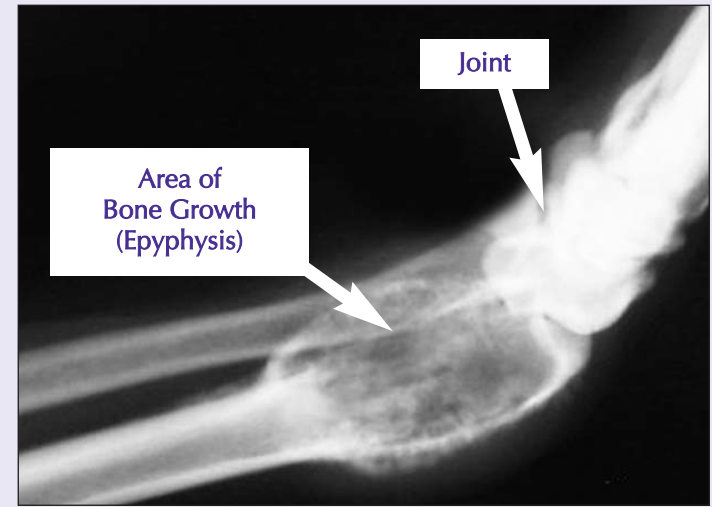
Another organ that often develops cancer is our skeletal system. Noteworthy is the fact that bone cancer occurs particularly frequently in children and adolescents.

This phenomenon, too, can now be explained. The bones are among those organs that undergo the most dramatic architectural changes during the growth phase from childhood to adult age. Bone growth requires a high activity of collagen digestive enzymes.

The extension of bone length is not a uniform process that occurs evenly across the entire length of a bone. It is concentrated at distinct areas towards the end of a bone – near the joint.

Not surprisingly, it is in this area, called the epiphysis, where most forms of primary bone cancers originate.

### Bone Cancer in Children



X-ray of bone cancer.  
Note the cancer development in the bone 'growth area' near the joint.

## Why Some Forms of Cancer Are More Frequent Than Others: *Leukemia*

Earlier in this chapter we described the white blood cells' (leucocytes) unique ability to migrate through body tissue with the help of collagen digestion enzymes.

Imagine if this process goes awry in some white blood cells. Then it would destroy the connective tissue without stopping.

Precisely that happens in cancer of white blood cells, also known as leukemia.

The innate ability of white blood cells to produce large quantities of collagen digesting enzymes render these leukocytes particularly prone to cancer.

Now we also understand why leukemia is one of the most frequent forms of cancer.

## Blood Cancer (Leukemia)



Leukemia cell under a highly magnifying electron microscope. The continuous secretion of collagen-digesting enzymes is illustrated by red 'pacmen'.



## A Closer Look at Leukemia

Once cancer cells produce the biological 'scissor' enzymes they no longer know any barriers and can invade and slowly 'digest' the structure of any organ of the body.

This is also true for leukemia cells. One of the phenomena associated with this form of blood cancer is the fact that leukemia patients do not primarily die from an overproduction of leukocytes and from these cells clogging the blood circulation.

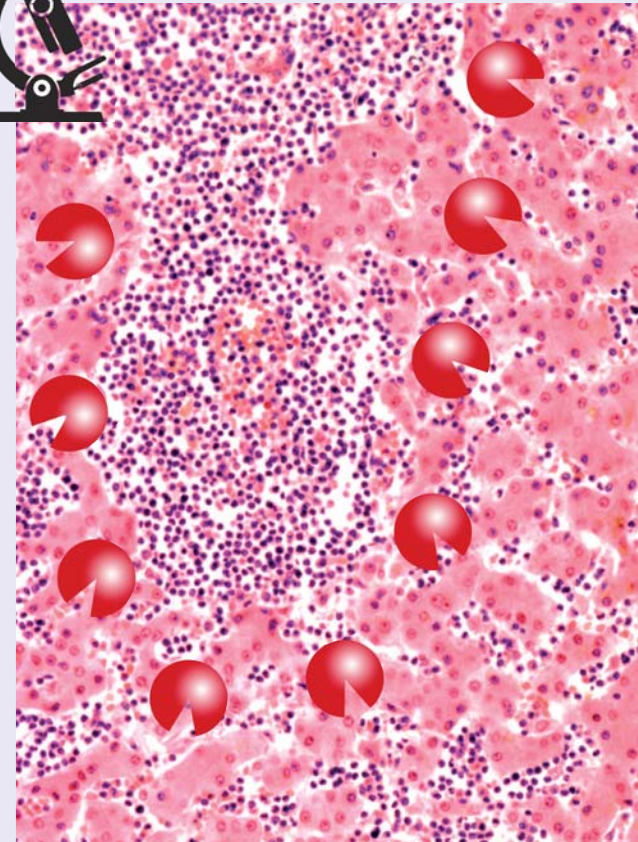
In many cases leukemia patients die from the failure of various organs, in particular the 'filter organs' - the liver and spleen. Millions of white blood cells invade these organs from the blood stream. But they don't just pass through like healthy white blood cells would do. These cancerous white blood cells produce immense amounts of collagen digesting enzymes, literally digesting these organs from within.

The picture on the facing page shows a microscopic cross section through the liver of a patient with 'lymphatic leukemia'. Each of the small purple dots in the picture is a white blood cell (in this case lymphocyte) that has invaded the liver tissue (pink areas).

Considering the massive number of these purple dots and how many collagen digesting enzymes each of them produces, it is easy to imagine the amount of connective tissue destruction and organ damage done by this type of cancer.

Leukemia is a good example of how the understanding of cellular mechanisms – the production of collagen digesting enzymes by white blood cells – guides us towards effective therapies.

## Leukemia Under the Microscope



**Microscopic picture of lymphatic leukemia.**

**Cancerous white blood cells (lymphocytes) invaded the liver. The massive amounts of collagen digesting enzymes they produce destroy the organ, eventually leading to organ failure.**

## Collagen Dissolving in Cancer

The collagen digesting mechanism we just learned about is being abused by all forms of cancers irrespective of their origin. The illustration on the facing pages shows an example of this process: The development of liver cancer.

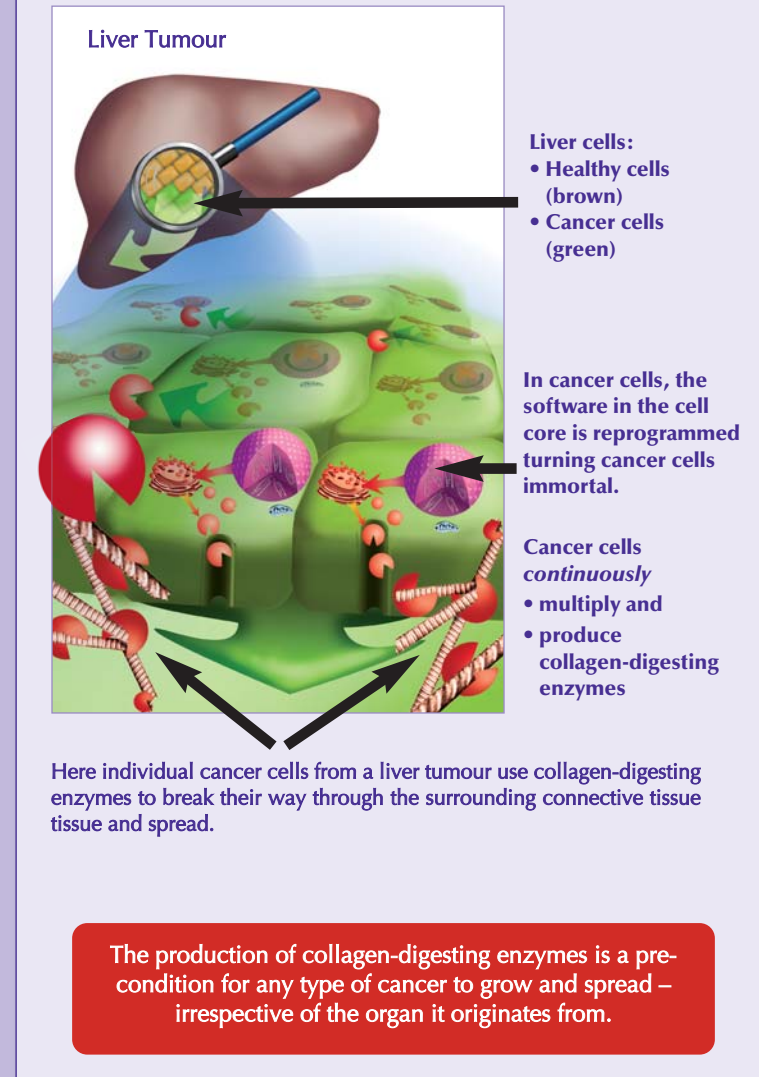
The liver is the body's central metabolic organ, among others, it is responsible for neutralising and removing toxins from the body. Toxins such as pesticides, preservatives as well as many synthetic pharmaceutical drugs are the most common causes of liver cancer. Liver cells that are exposed to these poisonous substances can be permanently damaged or destroyed. The most frequent form of damage leads to a permanently false 'programming' of the cell's genetic material (DNA).

Such a malignant alteration of the cell's software marks the beginning of the cancer process by activating a cascade of biological steps that eventually lead to full-blown cancer. Some of these steps are essential for the growth and spread of cancer:

1. **Uncontrolled cell multiplication.** The software of a cancer cell is altered in such a way that it renders this cell 'immortal' and causes it to multiply indefinitely.
2. **Mass production of collagen-dissolving enzymes.** The software of a cancer cell is altered in such a way that it renders this cell 'immortal' and causes it to multiply indefinitely.

The more collagen digesting enzymes a cancer cell produces, the more aggressive the cancer, the faster the cancer spreads through the body, and the shorter the life expectancy of the patient if the mechanism is not stopped.

## How Tumours Develop



## How Cancer Cells Spread And Invade Other Organs (Metastasis)

The collagen-dissolving mechanism also plays a major role when cancer cells migrate to form secondary tumour in other organs or parts of the body. This secondary tumour is called metastasis. The illustration on the facing page shows the process of a liver tumour metastasising to the lungs.

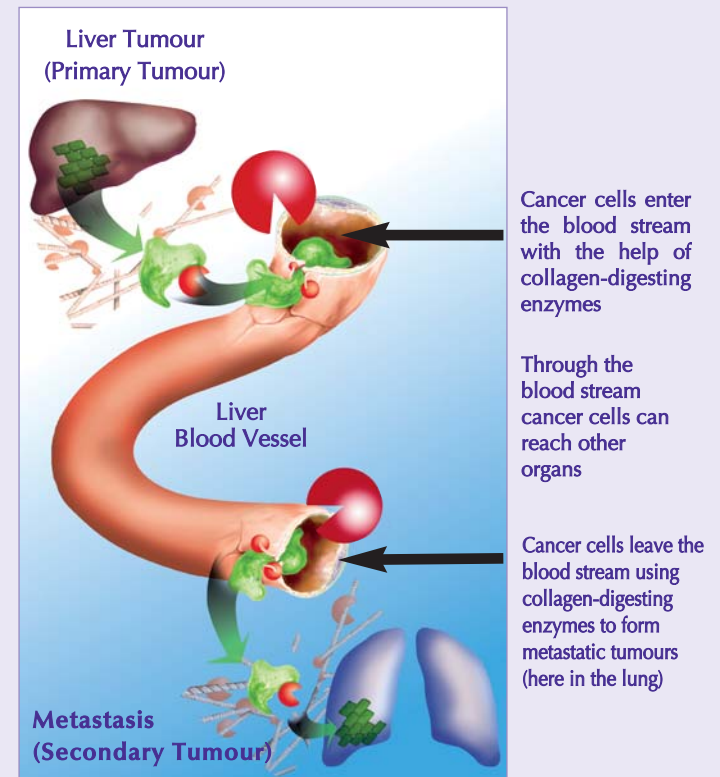
Every tumour is surrounded by a network of small blood vessels (capillaries). With the help of collagen-dissolving enzymes, individual cancer cells can 'puncture' the wall of these capillaries and enter the blood stream. Once inside the blood vessel, cancer cells are being swept away with the blood flow, just like red or white blood cells, and reach other organs.

The lung is a particularly frequent organ for the formation of metastasis because the blood circulation in the lung branches out into billions of tiny capillaries that facilitate optimum blood oxygenation. The diameter of these lung capillaries is even smaller than a hair which allows for an easy adherence of cancer cells to the wall of these blood vessels.

Since these cancer cells are still producing large amounts of collagen digesting enzymes, they now are able to leave the blood stream again and penetrate the lung tissue. There the cancer cells continue to multiply and develop into a secondary tumour, a metastasis.

The more collagen-dissolving enzymes a specific type of cancer cell can produce, the more easily it develops metastases.

## How Cancer Cells Metastasise



All types of cancer – irrespective of the organ where the primary tumour is located – use collagen-digesting enzymes to reach other organs in the body in order to metastasise.

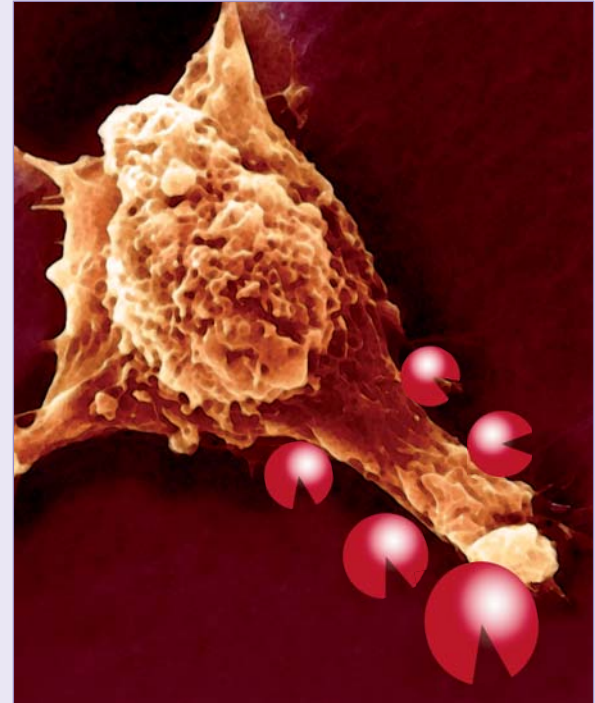
## Our Journey Through the Body Continues ...

The process of metastasis is no longer a mystery.

The picture on the facing page shows an actual cancer cell under a highly magnifying microscope.

The body of this migrating cancer cell expands in the direction of its movement in the tissue. It can form little 'arm'-like structures that drag the cancer cell along the surface, in this case, of a blood vessel.

The collagen digesting enzymes are added to illustrate the process by which any obstruction on the path of this cancer cell is being overcome.



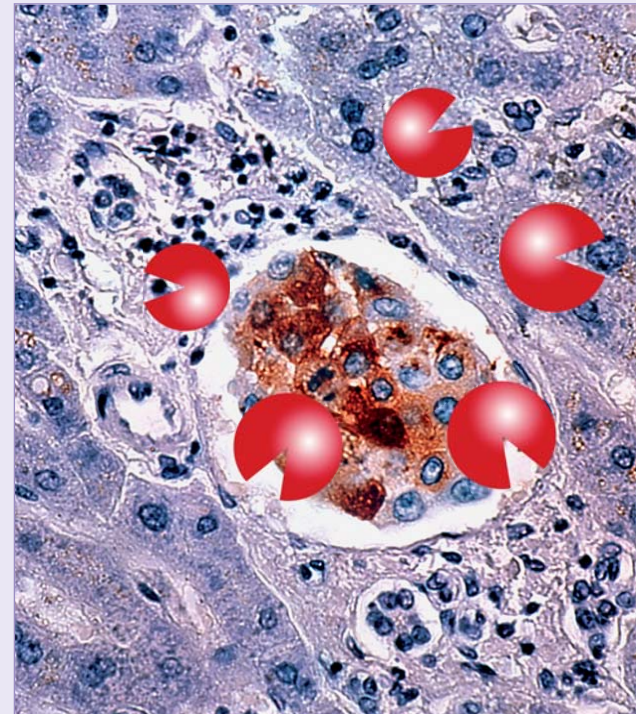


## Our Journey Through the Body Continues ...

Cancer metastasis is a unique process where the cancer cells of one organ nestle in a remote organ and begin to multiply there.

This unique mechanism leads to phenomena like the one shown on the facing page: A cluster of breast cancer cells is caught inside the portal vein of the liver.

Once these cells invade the liver tissue, a 'breast tumour' will start growing inside another organ, in this case the liver.



Microscopic picture of breast cancer cells (brown cell cluster in the centre) that have metastasised to the liver (blue areas). The cluster of breast cancer cells is shown within a liver blood vessel (portal vein).

Now That We Understand the  
Key Mechanism of  
How All Cancer Cells Spread,  
We Need to Find a Way  
to Block This Destructive Process –  
  
Naturally!

## Lysine as a Natural Enzyme Block

In previous chapters we have learned about the role of collagen digestion in facilitating the spread of diseases through the body. The uncontrolled activation of this collagen-dissolving mechanism leads to the development of aggressive diseases such as cancer.

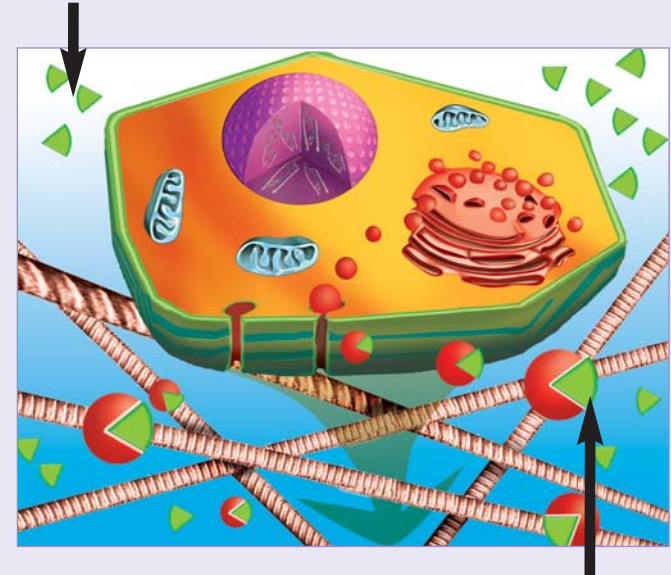
Every therapeutic approach that will halt uncontrolled connective tissue digestion or even slow it down will therefore be a momentous success in the field of medicine. Because of its universal importance in fighting all types of cancer, this therapeutic goal has been designated the 'holy grail of medicine'.

Interestingly, Nature itself provides us with two large groups of molecules that can block the collagen dissolving mechanism. The first group is the body's intrinsic enzymatic block that can stop the action of collagen-digesting enzymes in a few moments. The second group is the enzyme-blocking substances that come from our diet or as dietary supplements. The most important micronutrient is the natural amino acid L-lysine. When a sufficient amount of lysine is supplied as a dietary supplement, it can block the anchor sites by which collagen dissolving enzymes bind to connective tissue molecules. Lysine thus prevents these enzymes from uncontrollably dissolving connective tissue.

The facing page illustrates that lysine can inhibit the collagen digesting enzymes, the uncontrolled degradation of collagen and, thereby, impede the spread of cancer.

## Lysine Is the Most Effective Natural Way to Block Collagen-Dissolving Enzymes

**Lysine, a natural blocker of collagen-digesting enzymes, must be supplied from the diet.**



**Lysine occupies the 'anchor sites' by which the collagen-digesting enzymes would normally bind to the connective tissue molecules in order to digest them. Once lysine occupies these 'anchor sites', there is less binding of collagen-digesting enzymes to the collagen fibers and less tissue degradation.**

**The essential amino acid lysine can inhibit the uncontrolled digestion of connective tissue by cancer cells, thereby inhibiting cancer cell spread and metastasis.**

## The Remarkable Value of Lysine

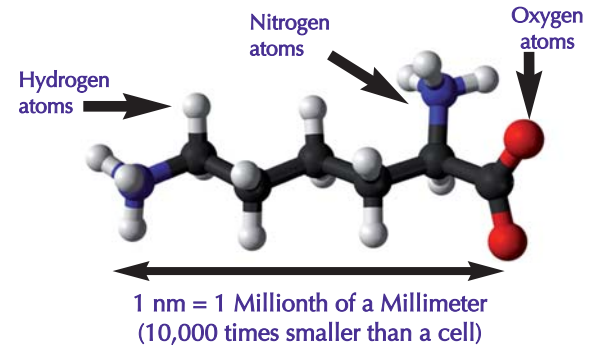
All metabolic functions in the human body are controlled by biological language. Some twenty known amino acids compose all the proteins in our bodies. These building blocks of life function like the letters of the alphabet. Our bodies use various combinations of amino acids to create innumerable biological words (peptides) and sentences (proteins). Separate amino acids (letters) also have important individual metabolic functions, and lysine is a prime example.

The cells of the body can produce most amino acids themselves. These amino acids are called 'non-essential'. However, there are nine known amino acids that our body cannot produce, so they have to be supplied through the diet. These amino acids are called 'essential'.

Lysine plays a similarly important role within the group of essential amino acids as does vitamin C within the vitamin group. The daily requirement for lysine surpasses that of all other amino acids. Among its many functions, lysine is also the basic building block of the amino acid carnitine, which is important for energy metabolism in every cell.

The fact that the human body can store a large amount of this amino acid proves its importance for our health. About 25 percent of collagen, the most abundant and important structural molecule of bones, skin, blood vessel walls, and all other organs, consists of two amino acids: lysine and proline. Thus, taking large quantities of lysine will not cause adverse effects since our body is familiar with this molecule and will simply excrete any amount not needed.

### The Natural Amino Acid Lysine



### How much lysine can our bodies handle?

- A human body weighing about 155 lbs. contains about 22 lbs. of proteins.
- 50% of this protein mass is present as the connective tissue proteins, collagen and elastin.
- The amino acid lysine forms about 12 percent of the collagen and elastin mass, or about 1.3 lbs.
- Therefore, a human body weighing 155 lbs. contains approximately 1.3 lbs. of lysine.

Since our bodies are accustomed to such large amounts of lysine, taking 0.4 ounces (11.3g) of lysine daily as a dietary supplement, e.g., by cancer patients, should not be considered excessive.



## The Role of Lysine in Balancing Collagen-Digestion and Repair

We have just learned that activity of the collagen digesting enzymes can be blocked in two ways: with the body's own inhibiting molecules (enzymatic proteins) and with natural inhibitors supplied in the diet, such as lysine.

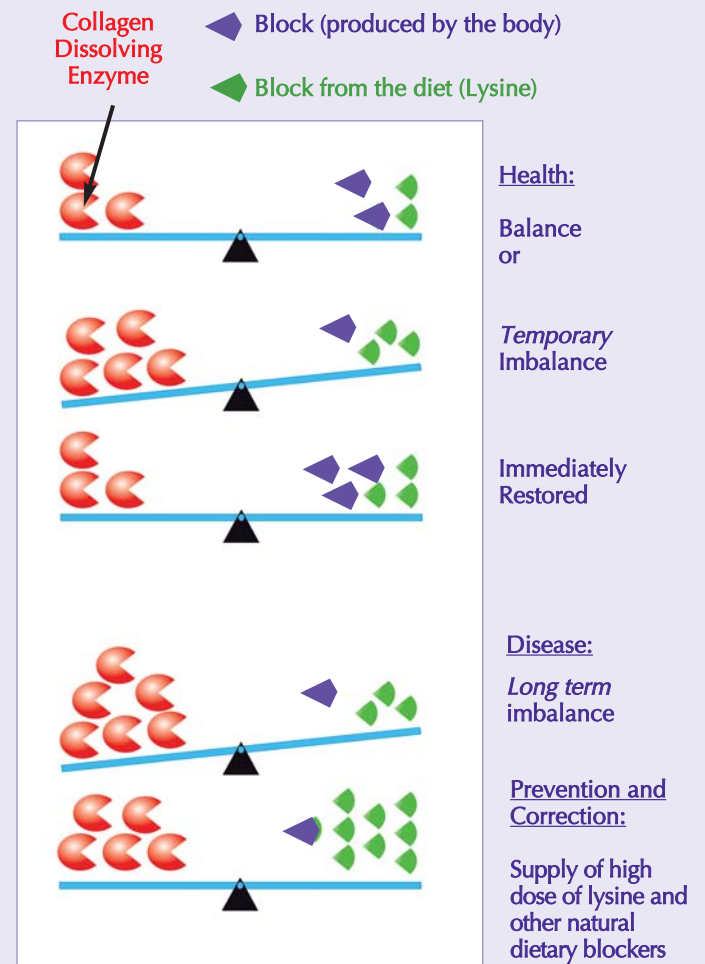
The body's internal inhibitors form the first line of defence that assures the balance between the degradation and new formation of collagen and connective tissue. In the illustration on the facing page, the enzyme 'blockers' produced by the body are represented by blue triangles.

Lysine molecules, shown in green, have the same goal. They form the second line of defence, ready to step in when the body's own systems are insufficient. The dietary 'blockers' cannot overshoot their goal, even when taken in high amounts.

A second important fact shown in the facing illustration is the balance between the collagen-dissolving mechanism (red) and its blocking mechanisms (blue and green) during health and disease. For instance, when fighting infections, white blood cells migrate through the body creating a momentary imbalance in favor of collagen degradation – just long enough to allow the leucocytes to pass through towards the site of infection. Once this cell has passed, the healthy body restores the balance within moments.

In cancer this balance is permanently shifted towards collagen degradation, and the internal 'blockers' are not sufficient to stop connective tissue destruction. In this situation, high nutritional intake of lysine and other dietary 'blockers' is the most effective way to restore the balance of connective tissue degradation and repair.

### Sustained Imbalance of Collagen-Digesting Enzymes Triggers Disease



## Vitamin C and Lysine: Key Molecules for Health

The stability of our connective tissue – and therefore our body's strength – is determined by two main factors: first, an optimum production of collagen and other connective tissue stability molecules, and second, the prevention of uncontrolled tissue degradation.

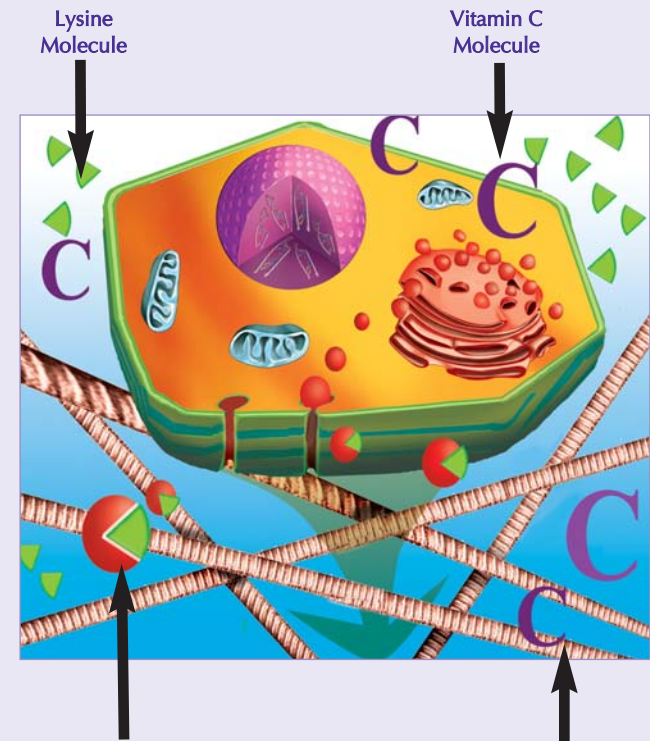
Besides lysine, vitamin C (ascorbic acid) is another essential micronutrient for our body. The role of these two micronutrients in providing connective tissue stability and, therefore, in helping to control cancer and other diseases can be summarised as follows:

1. **Lysine** inhibits the destruction of connective tissue by preventing enzymatic digestion of collagen molecules. At the same time this amino acid is an essential building block of collagen in the body.
2. **Vitamin C** stimulates the production of collagen and other connective tissue molecules and is essential for their optimal structure. As we know from the sailor's disease scurvy, deficiency of vitamin C weakens the connective tissue of our body. Vice versa, an optimal supply of vitamin C assures optimal production of collagen and elastin fibers and contributes to strong connective tissue.

What makes things worse is that the human body neither produces lysine nor vitamin C, and our modern diet does not contain sufficient amounts of them. As a result, almost every person suffers from long-term insufficiency of these essential micronutrients.

This knowledge now allows us to formulate effective strategies towards the control of cancer. Optimum production of connective tissue promotes the encapsulation, the biological confinement, of tumours.

## Encapsulation of Tumours by Natural Means



**Lysine**  
blocks collagen-digesting  
enzymes and uncontrolled  
destruction of connective tissue

**Vitamin C**  
stimulates the production of  
new collagen molecules and  
strengthens connective tissue

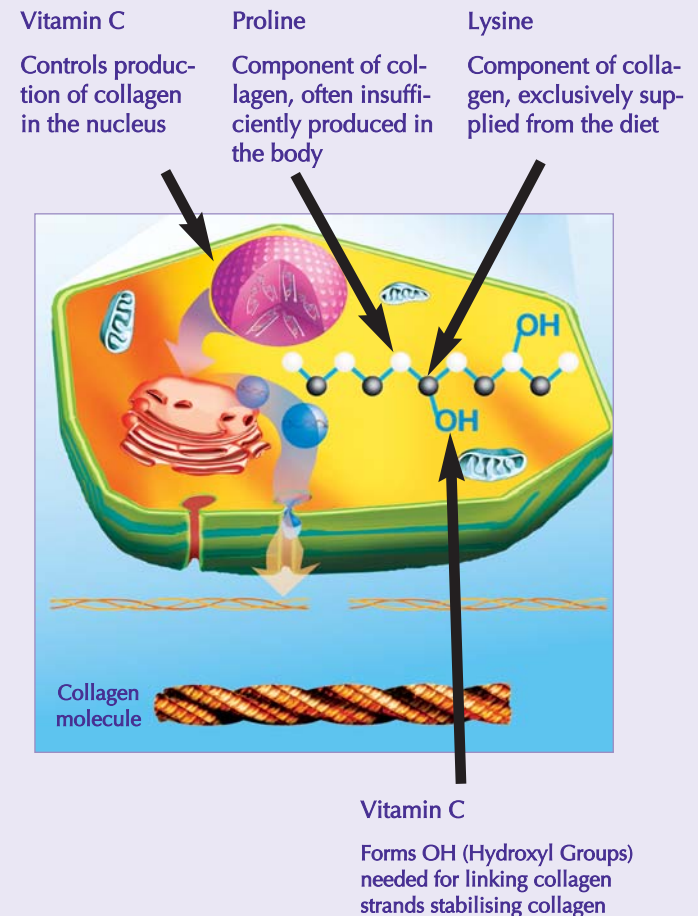
## Healthy Collagen — Key to Disease Prevention and Control

Optimal production of collagen molecules is critical for healthy connective tissue and it forms the basis for effective control of cancer and other diseases. The picture on the facing page illustrates the important steps of collagen production inside a cell and describes the essential role of certain micronutrients in this process.

Optimal production and structure of collagen critically depends on three micronutrients:

- **Vitamin C** controls collagen production at the level of the cell nucleus. In addition, newly formed collagen strands, which wind around each other like a twisted rope, need this vitamin to attain the optimum stability of collagen. Towards this end, vitamin C catalyses the formation of chemical 'bridges' between separate collagen fibers, which stabilise the entire structure.
- **Lysine** is an important building block of the amino acid chain that forms the collagen protein molecule. Since our body cannot produce its own lysine, every single lysine molecule must be supplied from the diet or from dietary supplements.
- **Proline** is an amino acid and also an important building block of collagen. In contrast to lysine, proline can be produced by our body, but only in limited amounts. If a person suffers from a chronic disease – associated with long-term enzymatic degradation of collagen – the body's capacity to produce proline can be exhausted. This often leads to relative proline deficiency with the known consequences of tissue weakness, which, in turn, facilitates disease progression.

### Amino Acids Proline and Lysine Are Building Blocks of Collagen



## Tumour Encapsulation: The Proof

Now we owe our readers a first scientific proof. We choose to document the decisive role of vitamin C for the encapsulation – the connective tissue ‘confinement’ – of tumours.

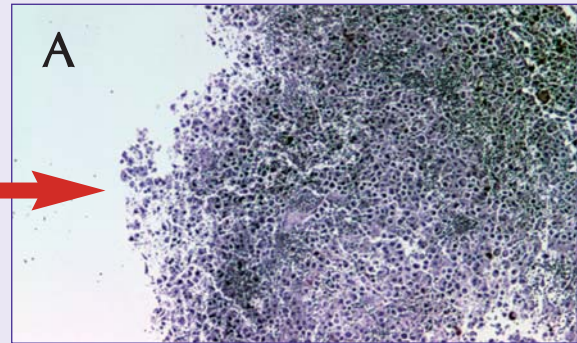
It is a remarkable fact that, unlike humans, most animals can produce their own vitamin C. Even more surprising is the fact that cancers are rare in the animal world - whereas they kill every fourth man and woman.

We wanted to study the intriguing question of whether it is possible that one factor alone, the presence of vitamin C in optimum amounts, can decide about the inhibition of tumour development. To answer this question we developed a mouse model that was unable to produce vitamin C in its body. By this genetic variation we mimicked exactly the ‘genetic defect’ that affects all humans today.

For the subsequent experiment we divided the animals unable to produce their own vitamin C into two groups. Then the animals of both groups were challenged with skin cancer (melanoma) cells. Subsequently, we placed one group of these animals on a diet containing optimum amounts of vitamin C, while the other group received a diet deficient in this essential nutrient.

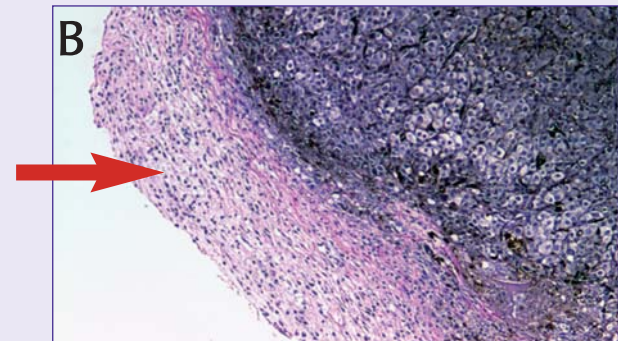
The facing page shows the dramatic results documented for the first time in this experiment. The animals with dietary vitamin C deficiency developed large tumours, which were growing diffusely into the neighboring tissue (picture A). In contrast, the animals supplemented with vitamin C developed fewer and smaller tumours. Most remarkably, optimum vitamin C in the diet led to the formation of connective tissue confinement (encapsulations) of the tumours in this group (picture B). This experiment shows that the presence or absence of vitamin C is a decisive factor stimulating the body's defence against cancer tumours.

### Scientific Proof: The Natural Encapsulation of Tumours is Possible



A. Cancerous tumour developed in a mouse, unable to produce its own vitamin C and kept on a vitamin C deficient diet.

Note the diffuse border of the tumour (arrow) with cancer cells easily invading the surrounding tissue.



B. With vitamin C supplementation, the mice in the same experiment formed a strong barrier of connective tissue around the tumour, confining it to its original location.

It is evident from this picture that encapsulated tumours are unlikely to invade the surrounding tissue and to metastasise.



## Victory Over Breast Cancer



My name is Baerbel Saliger.

At age 48 I was diagnosed with breast cancer, a moment that changed my life. I underwent surgery and had my left breast removed. The subsequent 14 cycles of aggressive chemotherapy made my beautiful hair fall out. For my partner I was no longer the woman he had loved. When he left me for good, my last spark of hope left with him. I did not want to live any longer.

My 18-year-old daughter and my parents took great care of me, but also relatives and friends called me and encouraged me. One year after undergoing chemotherapy, I was diagnosed with 'osteoporosis in the final stage', which put me down even further. I was desperate but I did not give up.

I could no longer walk and my hands were merely able to turn pages, but I could at least read. The cortisol I received made my body look puffy like a bowl of rising yeast dough, and a wheelchair had to substitute for my inability to walk.

It was at this point that I received information about micronutrients in the fight against cancer. I said to myself: "It can't get any way worse - from now on there is only one way, upwards."



## Meet Baerbel Saliger

Three months after I began to supplement my diet with micronutrients, the pain in my body subsided. I explained to my doctor that I no longer wanted to take the cortisol. She objected. Against her advice I decided to discontinue the cortisol. Four weeks later my blood tests showed good results. My doctor explained to me, that this was the result of the cortisol treatment. I smiled by myself but did not say anything.

Half a year after starting to supplement my diet with micronutrients I was able to walk again - and also to laugh again. I was convinced that pretty soon I would also be able to love again. When I sent the bills for the micronutrients to my insurance company, they denied the coverage - despite the fact that they had helped me.

When I look back today, the cancer diagnosis happened 12 years ago and the supplementation of my diet with micronutrients started exactly ten years ago.

In January, my daughter gave me a big bouquet of flowers and told me how happy she is that I am alive. If I look into the mirror today, the memories of the past sometimes come back, but only for a short time. Today a happy woman is smiling at me from the mirror.

Dancing has become my favorite hobby again – and in a few months I will become a grandmother. I couldn't be happier.

Halle, August 2011,

Baerbel Saliger

## What Did We Do to Spread This Message

When you read the testimonial of Mrs. Saliger on the previous pages you may have asked yourself some of the following questions: Have such cases occurred only in other parts of the world? Why are not more cancer patients worldwide taking advantage of this knowledge? Why aren't the media talking about it? What did you, as the pioneering researchers, do to spread this information?

These questions are all legitimate. We will provide detailed answers in Part 2 of this book. Here, we would like address only some immediate aspects.

Currently, we have information about several thousands of cancer patients, many of whom shared their records with us. Many of them are still alive after 10 years and longer of continuous micronutrients supplementation. Throughout this book we will share some of these reports with you.

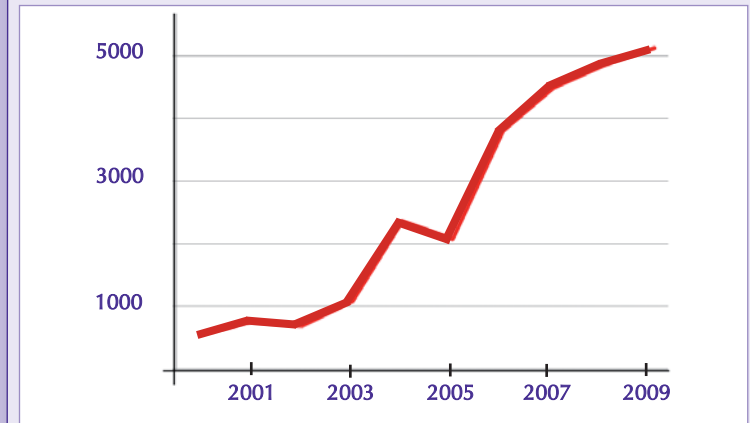
In 2001, we obtained the first confirmation about this breakthrough in the fight against cancer at our research Institute. Subsequently, we did everything to inform the world about it. One of the first steps was the publication of this medical breakthrough in the world's largest newspaper, USA Today, on March 8, 2002 (see chapter introduction).

In the following years we gave a multitude of lectures in the United States and many European countries. We went to universities with a focus on oncology and invited the medical profession there to join in an international research effort to save millions of lives.

In parallel, our research Institute became a leading independent research institution in science-based natural health. We are not aware of any other research institution that has published more scientific data about the natural control of cancer and documented it online ([www.drrathresearch.org](http://www.drrathresearch.org)).

Our message about the 'Victory over Cancer' through natural, non-patentable means was welcomed by the general public and open minded health professionals everywhere. However, for pharmaceutical-oriented medicine and for the 'business with

Increase in the Number of Annual Research Publications In the Field of 'Vitamins and Cancer'



Source: [www.ncbi.nlm.nih.gov/](http://www.ncbi.nlm.nih.gov/)

chemotherapy' our findings posed a fundamental threat. Not surprisingly, it was met from that side with indifference and even resistance.

Over the years, however, this resistance was decisively weakened by the large amount of research data published by our institute – and by an 'explosion' of research studies worldwide that followed our initial public announcement in USA Today in 2002 (see graph).

The next chapter will provide you with an overview of our compelling research that cracked the half-century old fortress of the pharmaceutical monopoly with chemotherapy and radiation in cancer.

## Your Personal Summary of This Chapter

When writing this chapter we had important goals in mind about the changes this information would make in the understanding of cancer by our readers. On this page we give you the possibility to check the most important of these goals.

Do you know now that:

Yes No

Cancer cells mimic natural mechanisms used by our body under normal conditions?

☐
☐

This biological 'deception' is the reason why cancer can evade the defence system of our body?

☐
☐

Every type of cancer cells uses aggressive enzymes that are able to destroy the surrounding connective tissue in order to spread and invade other organs?

☐
☐

By understanding the cellular mechanisms of invasion, we can identify key mechanisms and develop specific targets for the effective and natural control of this disease?

☐
☐

The amino acid lysine and vitamin C are the first two natural substances essential for stabilising the connective tissue around tumours – a key mechanism for the ultimate control of the cancer epidemic?

☐
☐

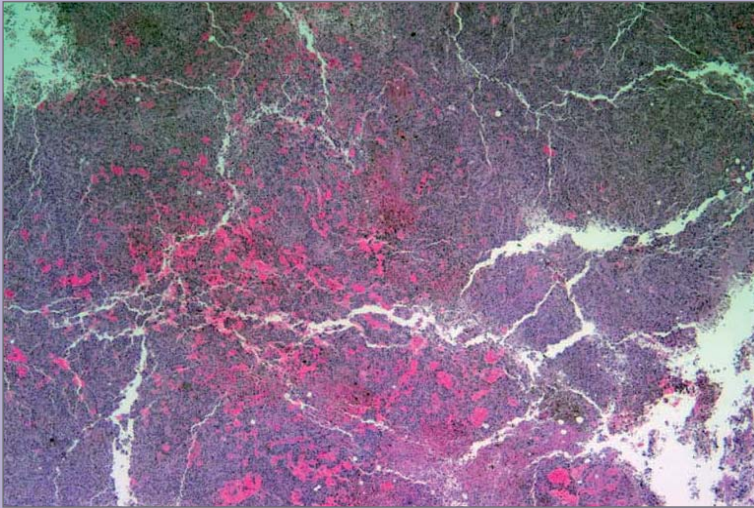

If you think that what you just learned is important for your fellow students, take this book with you to school or college and introduce it to them and to your teachers



The Goal of This Book:  
Ending the Age of Fear!







## Martian Storm

*'Science as Art' is an idea by August Kowalczyk.*

*'Martian Storm' is a microscopic picture of a melanoma tumour taken at the Dr. Rath Research Institute.*

Visit the entire art gallery at

[www.dr-rath-humanities-foundation.org/exhibition/index.html](http://www.dr-rath-humanities-foundation.org/exhibition/index.html).