Individual cancer therapy with specific activation of the immune system

IOZK IMMUNO-ONCOLOGICAL CENTRE COLOGNE

Welcome to the Immuno-Oncological Centre in Cologne

We are pleased that you are interested in the holistic consultation and treatment available by our interdisciplinary group of experts. Our doctors and scientists have been researching the role of the immune system in cancer and chronic infectious diseases since 1985. In recent decades this area has been an international research focus.

Our group has made possible the first approved autologous tumour vaccine in Europe with a manufacturing licence according to the German Medicines Act for advanced therapies. The vaccine consists of autologous dendritic cells that are loaded with tumour antigens. What is unique is the combination of a polyspecific vaccine with an oncolytic virus that is not harmful to humans and activates the immune system. Through the vaccine, the immune system precisely targets the tumour antigens of the own tumour and attacks it.

The complete cure of a tumour in an advanced stage is only rarely possible, even with this special therapy. But we are moving closer to the possibility of slowing the aggresive progression of the disease.

Our goal is to positively influence the course of the disease and to increase our patients' quality of life.

Immunological tolerance to tumour cells

The immune system is our body's natural health defence system. Its main function is to distinguish between its own and foreign cells, between harmless and dangerous substances, i.e., to ensure the integrity of body tissue (tissue homeostasis). The immune system can eliminate unknown substances, disease-causing agents and damaged cells.

Within the body's tissues cell mutations constantly occur. These are generally recognised by the body. If abnormal malignant cells develop, they are usually identified by the immune system and destroyed. Only if a misguided immunological tolerance towards the malignant mutated cells occurs can these grow into a tumour. If this is the case, there usually has been an immunological response against the tumour previously that was not successful. But memory T-cells remain in the immune system which can be reactivated to fight the tumour. We use this principle as part of our treatment approach.

The control mechanisms of the immune system are subject to failure, sometimes it can no longer perform its defensive functions. When tumour cells have survived in the body for some time and developed into a tumour, they influence the immune system. Through various biological "camouflage mechanisms" they inhibit the immune cell's attack and can make themselves "invisible". The organism starts to accept the tumour as the body's own cells although they harm the organism.

This immunological phenomenon is referred to as tolerance. The tolerance can be breached through specific immunological treatment. But if one's own immune system is to be activated, it needs the corresponding information from the cancer cells in order to overcome the tolerance. To this end we can apply our knowledge of the biological principles of immunology.

Active versus passive treatment methods

The current treatment of cancer concentrates on the destruction of the cancer cells through operations, radiation, chemo, hormone or passive antibody therapies as well as target therapies. The disadvantage of these treatments is that they do not differentiate between healthy and cancer cells as they are non-specific. This means that with conventional treatment healthy tissue will always be destroyed, leading to side effects. The main problem in conventional medicine is that the patient remains passive and that something is merely being done to them.

Immunological cancer therapy has led to a paradigm shift: the polyspecific immune therapy for cancer aims to enable the immune system to take up the fight against the disease itself. Specific immunotherapy is intended to activate the body's immune system enabling it to actively battle the disease. In saying that, it is not necessary to destroy each and every tumour cell. It has been proven that for overall survival as well as for an improved quality of life, an equilibrium between the tumour and the immune system is more important, resulting in an extension of the overall survival time with a higher quality of life. This is referred to as progression-free or metastases-free survival. For the first time it has been possible to show a correlation between immunotherapies and extension of overall survival time.

An immune system specifically trained to fight cancer

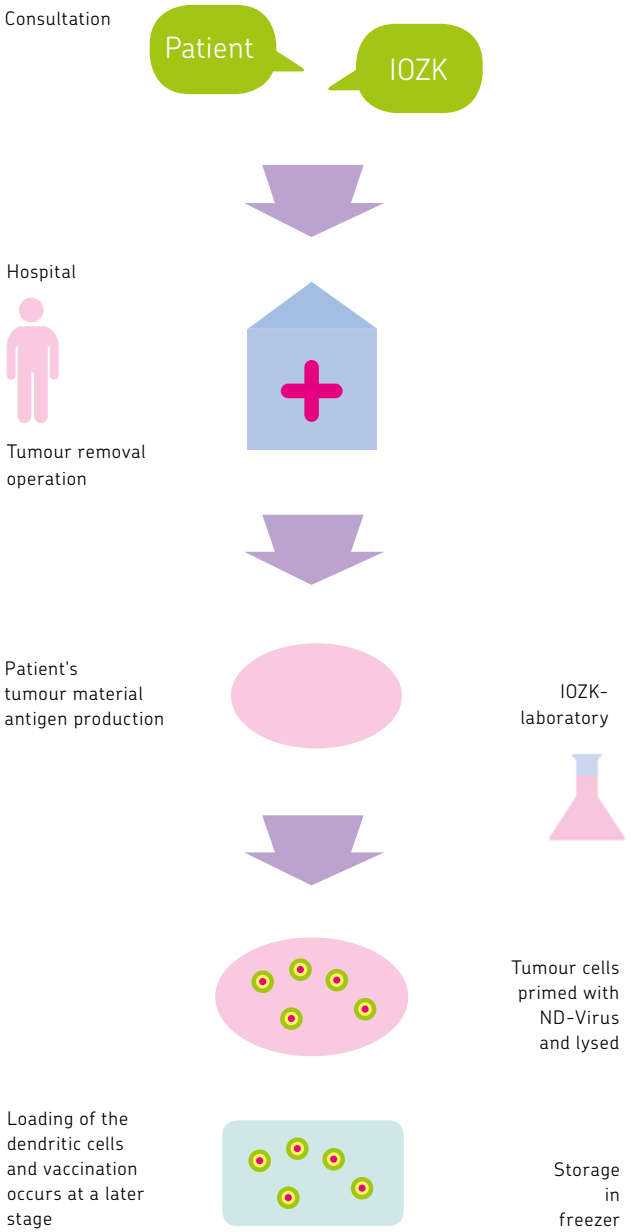
If the immune system is to become active against the disease it requires specific information about the cells to be attacked. For this purpose we have special accessory cells (antigen-presenting cells) in our bodies that act like guardians. The most important of these are the dendritic cells. Their task is to take up components of the malignant or infected cells (so-called antigens) and present them to certain immune cells (lymphocytes). With this information the lymphocytes develop into killer cells (effector cells) which circulate throughout the body and inhibit the growth or destroy the malignant or infected cells. A small portion of these lymphocytes develop into memory cells which allow an appropriate immune response in the long term.

Specific information about the tumour cells is therefore a prerequisite for the immune system's fight against these cells. Only through "antigen-presentation" can the lymphocytes recognise and destroy the tumour cells and also maintain a long-term defence against them.

Optimal time for treatment

It is best to start the treatment immediately after the complete removal of the tumour (R0 resection). During the operation, a portion of the removed tumour tissue should be designated for the use in immunotherapy and be sent to the appropriate specialist laboratory immediately. Our immunotherapy is usually possible at any stage during the course of the disease. However, the earlier therapy begins, the better the chances of success, especially with regard to the prevention of relapses (recurrences).

In the cases where the disease is already in an advanced stage, the development of a tumour-specific cytotoxic immune response should be promoted prior to use of checkpoint inhibitor antibodies. This enhances the efficacy of the checkpoint inhibitors.



Dendritic cells – key role as information providers

The patient's dendritic cells play a key role in the immune response against cancer. Thanks to modern cell culture technology they can now be cultivated in the laboratory from a simple blood sample. To achieve this, a subgroup of white blood cells, called monocytes, are isolated from the patient's blood. Dendritic cells are then differentiated through a complex process of stimulating various intra-cellular messengers and growth factors within five to seven days. Their cultivation requires a lot of time and resources. The process takes place in a specialised laboratory under the highest quality standards with state-of-the-art equipment. Therefore this method is associated with high costs.

Dendritic cells play a key role as guardians of our immune system. They are the most potent antigen-presenting cells, can activate killer cells and ensure a successful immune response. Their name originates from their typical tree like cell processes. (Greek déndron = tree).

Loading of information

The dendritic cells receive the necessary information about the cancer cells outside of the body in our laboratory. Using a specific method, the dendritic cells are placed in a test tube and brought into contact with the dead and specially processed tumour cells. Through this method they are "loaded" with the specific information needed to fight the tumour.

Information transfer

The transfer of information from the dendritic cells to the lymphocytes happens inside the patient's body. The dendritic cells loaded with information in our laboratory are reinjected into the patient. They travel through the lymphatic system and pass on the information regarding the cancer/tumour to the lymphocytes. These are activated by the contact and proceed to fight the malignant cells throughout the body.

Safety of this method

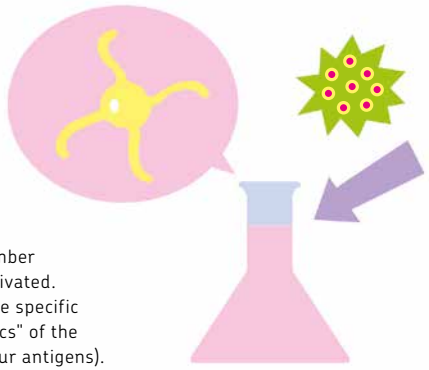
There are no safety concerns regarding reinjecting the information-activated cells that were previously in contact with tumour material back into the patient. This is due to them being the body's own cells (i.e., no foreign object). Additionally, the tumour material they are exposed to poses no threat as it was destroyed and manipulated during the production process. Prior to injection, all cell preparations are tested for absolute purity and undergo molecular analysis in accordance with the requirements of the Medicines Act. A variety of studies have been able to prove the safety of this procedure.

Successful vaccination

It is important to test whether the vaccination was successful and that the dendritic cells have actually passed the information on to the lymphocytes. After vaccination, a blood sample is taken from the patient and placed in a test tube. Here the patient's T-lymphocytes are then exposed to the tumour material. If the lymphocytes have been activated successfully they release messaging substances. If this is evident then the vaccine has been effective. Through our laboratory test the success of the vaccination is verified and the next vaccination appointment can be scheduled. Usually the dendritic cell vaccination is injected twice with a four week interval.

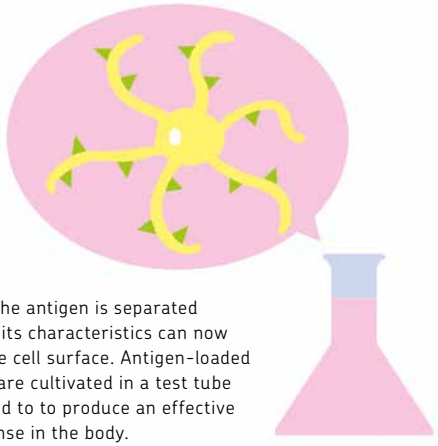
1.

Certain white blood cells called monocytes are isolated from the patient's blood. These are placed into cell culture flasks and differentiated through a complex process.



2.

After 5 days: A large number of dendritic cells are cultivated. These are loaded with the specific "identifying characteristics" of the cancer cells (called tumour antigens). These are infected with the Newcastle Disease Virus.



3.

After 7 days: The antigen is separated from the cells, its characteristics can now be found on the cell surface. Antigen-loaded dendritic cells are cultivated in a test tube and can be used to to produce an effective immune response in the body.

Monocytes

Immature Dentritic Cell

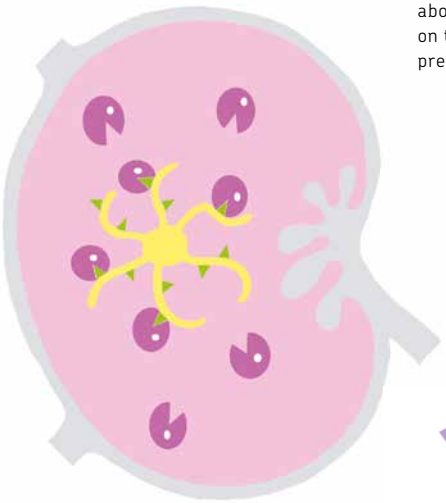
Mature Dentritic Cell

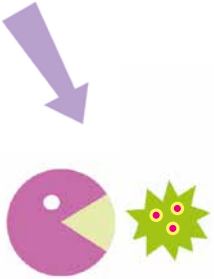
4.

The cell preparations undergo extensive quality control testing. The vaccine can now be injected.

5.

The dendritic cells quickly find their way into the lymphatic system. Once there they inform the lymphocytes about the tumour antigens on their surface (antigen presentation).





6.

The activated lymphocytes (or effector cells) have received a clear signal. They now multiply and circulate through the body, activating the immune response. The cancer cells which have been infected with the virus antigen become a target which the immune cells identify, attack and destroy.

Lymphatic system

Activated T-Cell

Quality control is essential

Highly qualified staff and a special clean room laboratory where foreign particles and interferences can be excluded are essential for successful immunological research and individual immunotherapy.

Human cells should only be grown in a clean room laboratory placed in special nutrient media at body temperature. In these laboratories absolute sterility must prevail in order to avoid contamination of the cell cultures. This is achieved through an overpressure system with material and personnel locks. A continuous outward flow of air prevents airborne contaminants from entering the room. This, together with the use of high-quality equipment, are the required high standards for clean rooms. In the IOZK laboratory a highly qualified team works in accordance with the Medicines Act following European GMP (Good Manufacturing Practice) standards.

Viruses – Assisting the therapy

When tumour cells manage to survive in the body for an extended period of time they are tolerated by the immune system, even though they are a threat to the organism as degenerated cells. T-lymphocytes (a type of white blood cell) whose task it is to destroy degenerated or virus-infected cells, do not attack the tumour cells as they are no longer recognized as dangerous. This tolerance, which is supposed to protect the body against autoimmune diseases, is paradox in the case of tumour cells and detrimental to the body.

But with a sophisticated method the tolerance of cancer cells can be overcome. There are viruses which only infect tumour cells whilst leaving healthy cells undamaged. One such virus is the Newcastle Disease Virus (NDV). It is pathogenic for poultry, but harmless for humans and does not lead to any adverse health effects. Once the virus has entered the tumour cells, they are altered. Post infection "danger signals" are sent out which are recognised by the immune system.

The immune system can now differentiate these infected tumour cells from healthy cells. This way the immune tolerance against the tumour cells is broken. The infection with NDV thus helps the immune system to distinguish cancer cells from the body's own healthy cells and fight them.

The IOZK satisfies all regulatory requirements for working with viruses – in this case Newcastle Disease Virus (NDV). The patient's tumour material is infected with the virus then lysed and used to load the dendritic cells. The IOZK's daughter company, Delta-Vir GmbH, in cooperation with VALNEVA and GenIBET Biopharmaceuticals, has been tasked with managing the production of NDV according to the European Pharmacopoeia regulations for therapeutic use in humans. Thus the IOZK are world-wide the first to use NDV produced under stringent GMP and regulatory conditions for their vaccine product.

Questions and answers about NDV/DC tumour therapy

Why do we often not see the desired results with standard tumour therapies?

Genetic studies have shown that tumours differ substantially. For example, in colon cancer only a few matching tumour-specific molecular structures were found in a large patient group.

Each cancer is unique in its structure. Therefore it is important for us to use the patient's own (autologous) tumour material when preparing our vaccine. This way we can create a bespoke, patient-specific vaccine which activates the individual's immune system to prohibit further tumour growth.

Does the R0 resection provide for full recovery?

In many cases individual tumour cells actively remove themselves at an early stage from the growing tumour. This can occur before the tumour is surgically removed or even before it is discovered and diagnosed.

Some of these cells lie as metastasis initiating cells (MIC) at a location away from the original tumour. These cells can both immediately or after some time become active and form metastases. For this reason, even if the tumour was removed successfully, it can often reoccur at a later stage. This is a situation we would like to prevent with our therapy.

Why do we vaccinate?

The "root" of a tumour consists of the so-called tumour stem cells. They define the progression of the disease. They divide into tumour cells which multiply and into stem cells that initially no longer divide themselves, but instead are in a state of suspension until their potential activation.

We now know that in solid tumours there are a variety of different tumour stem cell mutations. Because the stem cells do not divide often, they are not susceptible to conventional radiotherapy or chemotherapy. Once conventional treatment has ended, tumour growth can always reoccur, i.e., formation of metastases.

The aim is therefore to prevent the growth of metastases. Our specifically designed immunotherapy for tumour cells (including tumour stem cells) can form immunological memory, which is T-cell based. T-cells are long-lived and can be activated quickly in the body at any time and prompt an immune response to the threat.

When does the therapy begin?

For solid tumours therapy begins with the resection. In this case the surgeon removes the tumour completely from the healthy tissue. Part of the removed tumour material is required for our therapy and has to be sent to our laboratory in Cologne in a special container with a specific nutrient solution or in a dry sterile frozen state. The tumour cells are used for the antigen production of our vaccine, they supply the information about the tumour antigens of the patient.

Why is immune function tested prior to therapy?

Before immunotherapy the function of an individual's immune system must be taken into consideration. Only when the test results are available can the treatment be planned and tailored to the individual patient. Treatment will only proceed if the test results indicate the option of a successful course of therapy.

Why do we vaccinate with the body's own tumour cells or tumour cell components?

The immune system can mount a response against many structures that are presented to it. This does, however, not necessarily correspond to an effective immune response against the body's own tumour tissue, e.g., standardised tumour vaccines.

Only when the body's own tumour cell material is presented to the immune system as being "dangerous", can a specific and therefore effective immune response be generated.

What is so special about our vaccine?

Our cancer treatment is based on the use of an anti-cancer vaccine that stimulates a polyspecific immune response against the tumour cells which leads to the tumour cells being destroyed. The vaccine is unique in that it is individually made from the patient's own cells and specifically adapted to the patient's immune system. With this approach we enable the immune system to recognise and fight the tumour cells throughout the body (systemically). As we use autologous tumour material, we develop a range of tumour antigens which facilitates an individual polyspecific immune response. This enables the body to heal itself.

How does the immunotherapy proceed?

The NDV/DC vaccine contains a cell lysate (oncolysate) from the patient's own tumour cells that have been destroyed through infection with a virus. **In cases of inoperable tumours, tumour components can be extracted from the patient's blood.** The patient's own dendritic cells (DC) are loaded with this oncolysate or the tumour components isolated from the blood. These cells are of critical importance because they, along with the help of T-cells, provide for a specific immune response against the tumour.

The prepared vaccine (DCs loaded with autologous tumour antigens) is injected into the skin of the patients. Then a specific immune response against the tumour is developed by the body and circulated through the body. This is controlled by testing blood samples from the patient in our laboratory. After several immunisations, usually within a few weeks, the desired immune system reaction develops in the patient.

How is it determined if the vaccination was successful?

Prior to beginning the therapy, the T-cells which should learn how to fight the tumour, are isolated from a blood sample. T-cells have the ability to form an immunological memory. After our vaccination, they are again isolated from a further blood sample. An immune response is simulated in the lab. Tests are run during the process which indicate whether or not the dendritic cells have transmitted their information to the T-cells and in doing so have initiated their activation.

What is the Newcastle Disease Virus (NDV)?

During therapy we use a special virus that only replicates in human tumour cells. This has been known in research for many years. Studies have proven that the Newcastle Disease Virus is safe for humans and does not cause any disease or significant negative side effects.

In humans Newcastle Disease Virus propagates only in tumour cells and not in healthy cells. Post NDV infection the healthy body cells produce a defensive substance called interferon which inhibits virus propagation.

Why is a virus used?

Most tumour cells cannot produce enough interferon which results in them being infected with NDV. Through this they are "labelled" and are then recognised and classified by the immune system as dangerous. The tumour cells now present danger to which the immune system reacts and begins to fight the tumour cells.

We use the selective replication of the Newcastle Disease Virus to our advantage as it enables us to immunologically mark the tumour cells. As a result, the immune system can distinguish tumour cells from healthy cells more rapidly and effectively.

Why do we monitor the patient after the vaccination?

After vaccination, verification is required to determine if the T-cells actually recognise the tumour cells and that the immune system has been activated. Should this be the case then no further vaccinations are needed. With an ELISPOT test we can measure how many tumour-reactive T-cells are present as memory cells in the blood sample. This determines the further treatment.

What is the long-term success of the treatment?

Unlike conventional therapies, the vaccination method is a sustainable therapy. With treatment after an early diagnosis, our goal is to maintain the health of our patient. With treatment at an already advanced stage, we strive to relieve the patient's symptoms and improve the quality of life.

Are there side effects?

Unlike chemotherapy, our vaccination method only produces minor side effects. After the start of immunotherapy, slight flu-like symptoms occasionally occur. There are no other known side effects.

What does an individualised therapy mean?

The tumour-specific immune therapy is an individual, patient-specific therapy. Through an autologous vaccine the immune system is activated and enabled to take up the fight against the cancer. This means that each patient receives a unique therapy tailored according to their physical disposition, genetic makeup, and medical history, as well as taking the respective tumour development into consideration.

The autologous, patient-specific vaccine is produced according to the European Medicines Act and "Good Manufacturing Practice" (GMP) regulations for each patient as a personalised medicinal product. Thus patients at the IOZK receive the best possible immune therapy, tailored for them personally.

The IOZK treats patients under the German "individueller Heilversuch" regulation. There is no direct translation for this term or the German legalities associated with it, but it can best be described as compassionate use treatment. This approach is part of the therapeutic freedom granted to medical doctors. It represents a procedure which is primarily performed to the benefit of the patient once all other therapeutic options have been exhausted. Alternatively it can be started earlier on one's own account. Unlike clinical trials, the primary objective is not to gather general data on the patient's response. There are no set clinical values that need to be attained.

The tumour immunotherapy treatment at the IOZK is approved according to the Medicines Act §13.

What is the legal background?

The use of our vaccine is permitted according to the European Medicines Act on advanced therapy medicinal products (ATMP). It is the first combined vaccine of its kind in Europe. Several paragraphs of both the European and the German Medicines Act need to be considered:

- Authorisation to produce dendritic cells (§13 German Medicines Act for Advanced Therapies)
- Authorisation for processing human cells, i.e., tumour material (§13 German Medicines Act for Advanced Therapies / §20c German Medicines Act)
- Authorisation to work with viruses, i.e., NDV (German Infectious Disease Control Act §2 / Biological Substances Control Act V)
- Authorisation to produce a tumour antigen through virus infection (§13 German Medicines Act for Advanced Therapies /§20c German Medicines Act / Biological Substances Control Act V)

The IOZK uses the world-wide first NDV produced according to the European Pharmacopoeia for human use under GMP conditions.

Polyspecific immunotherapy – a new dimension in the treatment of cancer

In conventional cancer therapy the treatment focusses on the eradication of the cancer cells through external interventions: surgery, radiation, chemotherapy. More recently antibody therapies, such as target therapies, are being used. These are monospecific therapies. Usually solid tumours react to these monotherapies with a mutation, which results in a resistance against the monotherapy. This can add to the explanation why, despite decades of research and years of experience, no satisfactory results have been achieved for many types of cancer.

The fact that the immune system plays a special role has been assumed for a long time. In 1908 Paul Ehrlich together with Ilja Metschnikow received the Nobel Prize for Medicine for the establishment of immunology. Back then, Paul Ehrlich gave a lecture on the relationship between immunity and tumour formation. But only in recent years have the methods been developed for the analysis and manipulation of the immune system. Today, intensive research is being conducted worldwide in the field of immunological cancer treatment. In 2011 the Nobel Prize for Medicine was awarded for the research in the area on which the principles of the IOZK immunotherapy are based. The leading scientific journal "Science" named cancer immunotherapy as the breakthrough of the year in 2013.

New antibody therapies, called checkpoint inhibitors, are effective even when the tumour is at an advanced stage. These anti-body therapies presume an immune response against the tumour tissue. The treatment method in combination with an autologous vaccine established at the IOZK and approved by the regulatory authorities, creates the platform for the successful use of these new advanced therapy options.

In oncology, polyspecific immunotherapy is not yet a standard. It is generally known that a new scientific idea often takes a generation before it becomes fully accepted. In addition, this type of immunotherapy is absolutely unique. It is based on the use of the body's own cells and is a time consuming and costly procedure. Only clinical studies where the patient's own antigens were used demonstrated a significant increase in lifetime.

Even if individualised immunotherapy is not yet established as the standard treatment for cancer, as a translational centre, it is the IOZK's mission to utilise cutting-edge research findings to provide this effective patient-specific therapy to patients who urgently require our help on an individual compassionate-use basis. However, an individualised treatment always requires that the patient is proactive in making choices about the way forward and their therapy options.

Studies

Clinical studies have shown that specific immune therapies can be combined well with conventional therapies. In addition our therapy is not known to show any significant adverse reactions.

Insights into our scientific work:
www.iozk.de/website/publications/en

Hyperthermia – an ideal complement to immunotherapy

Hyperthermia (elevated body temperature) of the entire body or individual parts of the body, has a variety of desirable effects on the immune system and the tumour cells. It has been used successfully in the treatment of cancer and can improve the effects of the traditional forms of treatment as well as immunotherapy. Depending on the type of cancer and the state of the individual's immune system, IOZK has a variety of different hyperthermia treatment methods.

Local-regional radiofrequency hyperthermia

This method is used in cases of minimal tumour growth for outpatient treatment. A therapy session takes up to 60 minutes. Radio waves with a specific frequency are focussed on the tumour from the outside. Due to the different properties of the tumour cells and healthy cells, the radio waves only damage the tumour cells.

To protect themselves from cell death, the tumour cells form heat shock proteins (HSP). When producing these HSPs the tumour cells lose their camouflage (immune tolerance) and can be detected by the immune system. Through an electric field, radiofrequency hyperthermia causes the formation of HSP in the tumour as well as programmed cell death. This results in cell fragments being formed which can then be presented to the immune system.

In addition to the direct effect of the warmth and the electrical field, this form of hyperthermia shows an immunologiocal effect. Furthermore, the elevated temperature causes an increase in blood flow through the tumour that enhances the effectiveness of radiotherapy and / or chemotherapy as well as antibody therapy.

Transurethral radiofrequency hyperthermia

Transurethral radiofrequency hyperthermia is a special form of local-regional radiofrequency hyperthermia. It is used for the treatment of prostate cancer in both early and advanced stages. A catheter is temporarily placed in the urethra and a radiofrequency transmitter is positioned in the immediate vicinity of the prostate. In this way a minimal dose causes maximum effect. The frequency of the application is dependent on the individual treatment plan, but in general it is only applied twice during the course of the treatment.

This form of hyperthermia has also been shown to be effective for the treatment of prostate hyperplasia. The local application of high temperatures causes the destruction of hypertrophic prostate tissue. The volume of the prostate is decreased. As a result the urethra is no longer blocked by the enlarged prostate and urinary flow is improved.

Moderate whole body hyperthermia

This method elevates the body temperature to between 38.5 and 40.5°C . This corresponds to a natural fever reaction that activates the immune system. The moderate whole body hyperthermia treatment session can take up to six hours. The patient rests on a bed in a thermal chamber. A layer of warm air forms around the body through infrared radiation and prevents evaporative cooling. Body temperature, heart rate, blood oxygen levels and blood pressure are monitored continuously. This is followed by a resting period. The aim of whole-body hyperthermia is to set the immune system to a state of high alert.

We use whole body hyperthermia as an additional tool for aiding the success of the overall treatment. We have a holistic approach to our therapy and always take into consideration each individual patient's condition and immune status when considering treatment options.

Dr. Wilfried Stücker

Tumour Immunology
Pharmaceutical Biology
Translational Oncology
Naturopathic Practitioner

"With our multi-disciplinary approach at the IOZK we offer our patients valuable treatment options which supplement and complement conventional methods."

The insights we have gained in the last decades about the functioning of the immune system play an important role in our work as team of experts. Given the wealth of medical knowledge in today's world it is essential to collaborate in interdisciplinary networks and to exploit synergies in this way.

This is also the guiding principle of our team at the IOZK. The close cooperation between our medical and scientific experts provides our patients with valuable treatment benefits derived from cutting-edge scientific research and knowledge. This has resulted in our team developing the first therapeutic autologous polyspecific tumour vaccine based on dendritic cells loaded with virus-infected autologous tumour antigens. For this vaccine our treatment centre received a manufacturing licence according to the German Medicines Act, a first in Europe.

Prof. Dr. rer. nat. Volker Schirrmacher

Tumour Immunology
Head of Research

"Through the specific activation and individual support of the immune system to fight against a patient's own cancer, new and promising treatment options are available to patients today."

Overcoming barriers is one of the current challenges in oncology. Only then can we develop innovative therapies. Immunotherapy is such an example of a new treatment in oncology. Successful results have shown us that we are on the right path with our treatment approach.

At the IOZK we offer patient-specific immunotherapy. We are flexible and can adapt quickly to the needs of our patients. This way we can implement individual therapy much better and in a more personal manner than, for example, at a university clinic. We work on the basis of clinical studies that are specifically optimised for the individual patient.

Stefaan Van Gool, MD, PhD

Specialist in Paediatric Hemato-Oncology
Medical Management of Translational Oncology

"The manufacturing authorisation now enables us to make this treatment available to our patients more readily. Through this, they have the chance of a longer life with a better quality of life."

Currently oncolytic viruses combined with a dendritic cell vaccine are approved for the treatment of patients with cancer at the IOZK. At the same time, new developments in preclinical research can easily be translated into clinical applications through the interdisciplinary IOZK team.

Dr. med. Katharina Sprenger

Specialist in General Medicine
Tumour Immunology

"When treating tumour diseases, it is becoming ever more apparent that there is not 'the patient' and 'the tumour'. Standardised procedures, which do not take the individual situation into consideration, are only of limited benefit."

It is my belief that the future of tumour therapy lies in personalised medicine. The guidance and strengthening of the patient's own defence mechanisms – instead of exclusively destroying the tumour through surgery, chemo- and radiation therapy – convinces me. I am delighted that I have the good fortune to be able to work on the development of such strategies to benefit the patient.

Dr. med. Tobias Sprenger

Specialist in General Medicine
Consultant for Expert Medical Opinions

"Guidelines should support doctors and patients to find the correct therapy, not replace the thinking process."

In my profession as a doctor it is of utmost concern to me to understand the values and concerns of my patients. It is important to me to recognise them as individuals and support their autonomy. Individuals who consciously select their own mode of therapy and identify with it stand a better chance of mastering a health crisis than those that blindly leave the treatment decision to somebody else. This is the reason why I do not trust medical practice which blindly follows rules and regulations without acknowledging the individual patient.

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Published: September 2018

Design:
Riegel + Reichenthaler

Photography:
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09/2018

IOZK IMMUNO-ONCOLOGICAL CENTRE COLOGNE