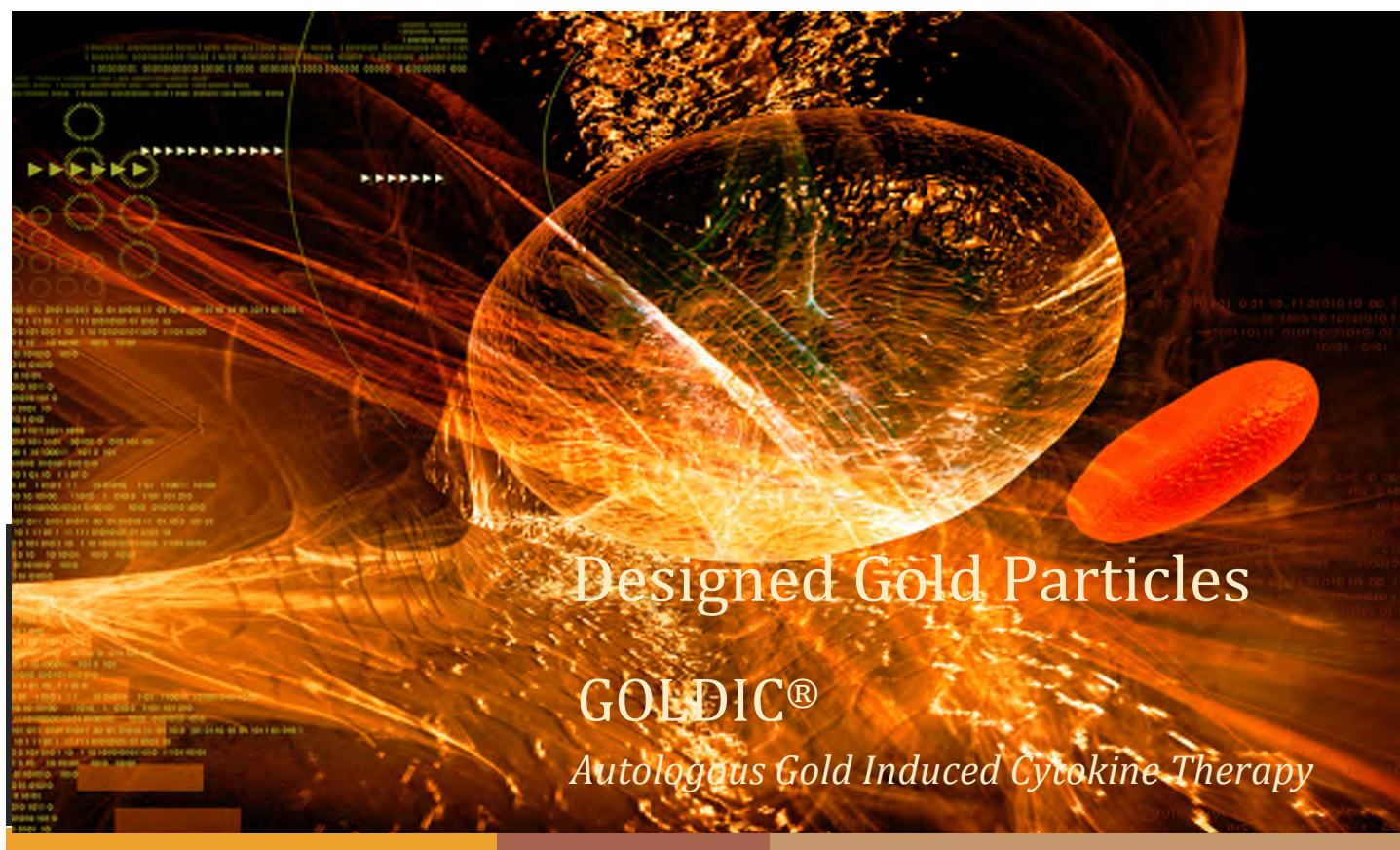


GOLDIC®

Individualized Medicine





Gold as Medicine.

It is one of the oldest medicines in human history. Aurum metallicum, the “Metal of light”. Scientists can now unequivocally explain why the mystical metal has healing properties. Swedish and American researchers have found that gold has a regulatory effect on the human immune system in minuscule doses.

The effect of gold is well known in rheumatology and it has been sufficiently documented. However, gold often has serious side effects in the body besides the good, healing effects.

Hence, for developing the **GOLDIC® - Technology**, the goal was to enable a contact of endogenous blood cells and specially designed gold particles **outside** the body.

We can experience the positive effect of gold without its side effects by stimulating the active substances, cytokines, (above all the key protein “**Gelsolin**”), proteins and growth factors that are administered to the patient again separately.

GOLDIC® stands for “**Gold Induced Cytokines**”.

For the treatment with **GOLDIC®**, a small quantity of the patient's blood is taken from the vein. This blood is incubated under the presence of defined gold particles for over 24 hours in an incubator. Afterwards the blood cells and the gold particles are separated by centrifugation.

Only the processed, activated serum is injected in four (4) treatments over a period of approximately two (2) weeks to the patient where the symptoms occur.

A special filter prevents the gold particles from directly entering the patient's body with the serum.

Our many years of research have shown that specially designed gold particles lead to a successful tissue reaction in conjunction with the patient's own blood. The application of **GOLDIC®** has been explored in various studies as well as experimentally and clinically.

The **GOLDIC® - Therapy** is a form of stem cell therapy, which activates the existing local stem cells and supports their differentiation.

GOLDIC® is our platform technology for treating different syndromes. This form of treatment involves a special type of individualized medicine. It correlates to the concept of “Intelligent Tissue Regeneration” (ITR).

GOLDIC® is anti-inflammatory, it reduces the pain and activates and differentiates autologous stem cells and simulates the body's own **REGENERATION**.



Regeneration of tissue is possible.

Our focus is on developing alternative therapies for orthopaedic and sports-medical problems of the musculoskeletal system.

“GOLDIC® is the next generation of stem cell therapy with the help of specially designed gold particles using patient’s own blood. This form of treatment involves individualized medicine.”

“Regenerative Medicine” is a very recent and highly promising field of modern medicine with the goal of going away from a “reparative” form of medicine to a “regenerating” form of medicine to be able to achieve lasting improvements for the patients.

GOLDIC® stands for “GOLD INDUCED CYTOKINES”.

Cytokines are proteins that regulate the growth and differentiation of cells. Cytokines are a group of peptides, which mainly initiate or regulate the growth, the proliferation and differentiation of target cells.

Some cytokines are accordingly known as growth factors, the others play an important role for immunological reactions and for inflammatory processes. These can be described as newly formed substances, so-called mediators. There are essentially five main groups of cytokines:

Interferons, interleukins, colony stimulating factors, tumour necrosis factors and chemokines.

Cytokines are steadily gaining importance in medicine and in cellular biology.

GOLDIC® - Therapy

Here a small quantity of the patient’s blood is taken and then it is prepared through a process with the help of specially designed gold particles. The shape, number, surface, concentration and size of the gold particles play a decisive role here.

In this process, the regenerative factors (cytokines and various growth factors) from the patient’s own body are filtered and concentrated. This optimized solution (serum) produced naturally in the body is then injected in the painful area (defective zone) without other additives.

The objective is to stimulate the body’s own power in such a way that damaged or injured tissue can be regenerated. This is done with the help of stem cells from the body itself, which are activated and differentiated.

Successful treatment of degenerative and inflammatory connective tissue diseases by activation and differentiation of the body's own stem cells on the site.

Gelsolin is a decisive factor in healing.

The key protein in case of **GOLDIC® - Therapy** is **Gelsolin**. The Gelsolin level of patients in conjunction with other cytokines (proteins) is especially important for successful treatment.

Gelsolin is the longest known member of a family of actin-binding proteins. Scientists have found from extensive studies that in all types of injuries, inflammations or degenerative processes, this protein called **Gelsolin** is severely reduced.

Gelsolin is an important protective protein and it prevents the toxic reaction, which occurs when cells die. Moreover, **Gelsolin** causes the differentiation of body's own cells, which are necessary for regeneration of tissues.

Furthermore, important stem cell specific factors like G-CSF (granulocyte-colony stimulating factor) and SCGF-β (hematopoietic stem cell growth factor - beta) are produced to a significantly high degree.

Using the GOLDIC® - Therapy, there is an individually increased production of

- **Gelsolin,**
- **G-CSF and**
- **SCGF,**

in the patients which amounts to a multiple of the initial concentration.

Through the contact of the patient's blood with the gold particles, the white blood cells (leukocytes) and mainly the monocytes are activated. Amongst the white blood cells the monocytes are in the best position to neutralise (to phagocytose), it literally means to "devour", bacteria and tissue debris.

What is the role of the growth factors?

Growth factors support the formation of new tissue. Proteins that are transferred as signals from one cell to a second, thus forwarding information is known as growth factors in cellular biology.

These proteins also regulate different intracellular processes in their function as "Signal Proteins" and they especially play a role in development of multi-cellular organisms. As a rule, the signal transmission happens using the binding of the growth factor at a specific receptor in the cell membrane.

What is the function of stem cells?

Stem cells are undifferentiated cells thus capable of giving rise to indefinitely more cells and specialising in a specific function.

A distinction is made between embryonic stem cells from which a whole organism can be produced and adult stem cells. Adult cells already have a limited differentiation capacity and can be obtained throughout a person's life from different parts of the body (e.g. bone marrow, adipose tissue etc.). These cells are responsible for maintenance of the balance between degrading and building processes in the body. It means that adult cells can transform into all specific cells present in the body and can also produce new stem cells.

The adjacent environment along with the growth factors decide the assignment of stem cells, whose purpose is to regenerate and replace the damaged or dead cells on the site.

GOLDIC® - Therapy in comparison with other procedures:

For example: Stem cell collection

Stem cells that are collected from the bone marrow or from the adipose fat tissue (operation under general anaesthesia with all possible risks and side effects), must still be cultivated in the lab to obtain an adequate number of stem cells. Injecting these stem cells is possible only after a few days due to the time required for the cultivation and differentiation.

In addition, adult stem cells are not practicable for all body tissues and are difficult to obtain. Restricted growth and conditional transformability limit their use. The cost factor will also play a significant role here.

Even stem cells age and thus old stem cells are less functional than younger ones. Theoretically, it must be considered that if the cultivation is done with the same stem cells several times, there can be a risk of degeneration of individual stem cells. *

PRP and ACP (Autologous Conditioned Plasma) procedure:

The normal PRP (Plated Rich Plasma) procedures mainly use the thrombocytes obtained from the blood plasma of the patient as well as growth factors and at most a relatively low number of stem cells.

In this way the inflammation in the damaged tissue / organ / joint can be reduced, the important Gelsolin level is decreased in this process and not increased as in case of the **GOLDIC® - Therapy**.

**Brunet et al; Ageing: From Stem to Stern; Nature (2007); vol. 448, pp.288--291*



“Health is wealth”

Arthur Schopenhauer

The **GOLDIC® - Treatment** at your doctor is a part of the concept of **“Intelligent Tissue Regeneration” (ITR)**:

The therapy is based on offering an individually coordinated combination therapy for you, which is optimally adjusted to your needs and expectations.

To do this, it is necessary to first analyse the individual factors of pathogenesis, to understand the existing damage situation and then determine the ability to cope (individual diagnosis).

Depending on the discrepancy between the damage and the ability to cope, an individually customized therapy program is developed.

This therapy program can be structured from widely differing modules. The modules can consist of purely conservative or even combined surgical-conservative components. Combination of different modules is important to achieve an optimal interplay of individual forms of therapy with a significantly reduced spectrum of side effects.

GOLDIC® - Therapy for sports injuries

If you just want to get a sports injury treated or if you are under rehabilitation then you can support the healing process of your body with this therapy.

Using your own blood prepared according to our therapy with gold particles is an appropriate measure for it. The healing process of an injured tissue goes through a complex and precisely regulated series of endogenous processes. Different proteins and their “interplay” in the blood are responsible for the regeneration.

The **GOLDIC® - Procedure** is well suited for treating acute and chronic tendon disorders at the elbow (“tennis elbow, golf elbow”), the shoulder, painful changes of the Achilles tendon, kneecap point syndromes “Jumpers Knee”), heel spur and muscle injuries.

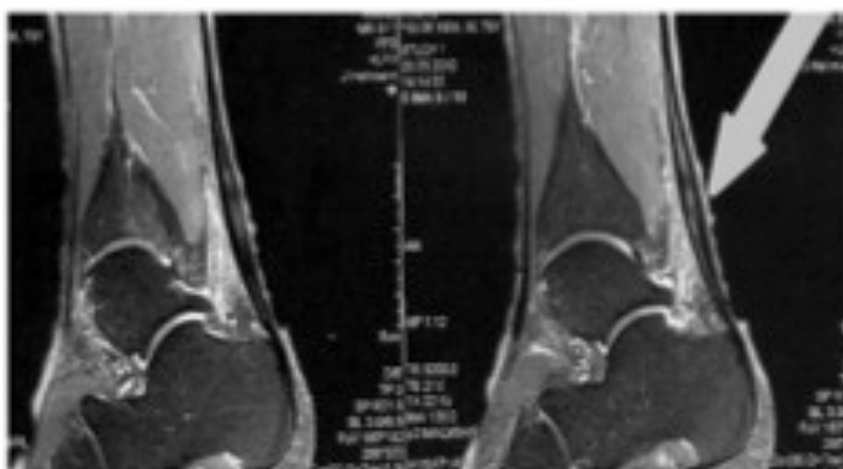
GOLDIC®- Treatment for a 80 year old patient - chronic tendonitis - Achilles tendon

Achilles tendon - tendonitis

This means painful changes in the area of the Achilles tendon.

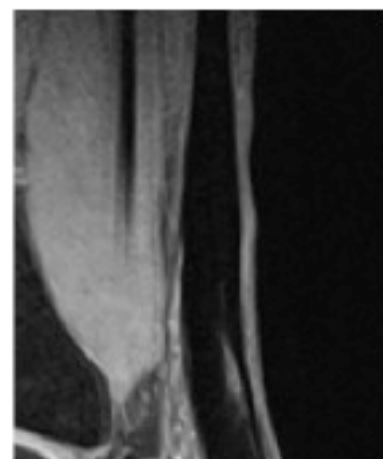
Many patients with long-standing problems in the area of Achilles tendon report intermittent occurrence of pain. A trigger event connected with acute pain in the area of Achilles tendon is frequently stated. This recurring action is described frequently over several years and it repeats in the course of time in shorter and shorter intervals. This often goes so far that light jogging becomes impossible and even long or speedy walks can cause painful problems.

The basic problem of the tendon here is the recurrent tearing which finally leads to advancing scarring within the tendon due to incomplete healing and repeated trauma. In addition the blood flow in the tendon mainly deteriorates under the strain. In advanced phases of the disease, a change of the tendon cover occurs which is characterised by increased hardening of the tendon sheath. In this way the increase in the size of the tendon under strain is prevented or repealed.



Status of the 80 year old patient before the GOLDIC® - Treatment:

The fatty degeneration and the scarring in the tendon are clearly visible.



Situation of the patient 1 year after successful GOLDIC® - Treatment:

In these images we can see the REGENERATION of the tissue and thus the connected recovery of the normal anatomy of the Achilles tendon.

The term osteoarthritis describes a “joint wear” which exceeds the wear normal for the age. Reasons can be over-straining, congenital or accident-related malpositions of the joints or even bony deformation due to bone diseases like osteoporosis.

GOLDIC® - Therapy for osteoarthritis

Osteoarthritis means the wear and tear of the joint cartilage. The causes for occurrence of osteoarthritis are many.

With increasing age, the biological tissues are subject to degenerative processes, which can lead to destruction of the tissue and to loss of function in the later stages. These processes are influenced by many different factors. Therefore, the medicinal therapeutic approaches available until now only have a symptomatic effect and have a number of side effects.

Osteoarthritis often remains unnoticed as the wear of the cartilage mostly causes pain only in the last stage.

Treatment of osteoarthritis is based on the cause and severity of the disease. There are two big groups for osteoarthritis therapy: conservative and surgical treatment. It depends on the pain, the clinical investigation and the X-ray results. Many a time therapy combinations from both groups are useful. The ascertained extent of damage to the cartilage also decides the treatment options.

Cartilage damage can be divided in four degrees of severity:

Grade I = slight blistering on the surface.

Grade II = minor defect and minor tears in the surface of the cartilage

Grade III = deeper defect that reaches the bones with a lot of wear, no longer sustainable mechanically

Grade IV = the cartilage has lost all of its thickness, leaving the bones of the joint exposed.

Objective of the **GOLDIC® - Therapy** is always the restoration of the natural joint function and freedom from pain as far as possible.

The **GOLDIC® - Therapy** can greatly help in case of Grade I and II cartilage damage and it can stimulate the regeneration of damaged tissue.

For cartilage damage of Grade III and IV, the mechanical problems must be treated first. If a surgical intervention becomes necessary due to this damage, the minimally invasive methods must be given priority. In addition, latest procedures also enable arthroscopic filling of the defective zones in the cartilage.

If the existing joint displacements or ligament instabilities are the cause for the cartilage damage diagnosed, these factors must also be treated.

The treatment with **GOLDIC®** assists the healing process and adds more surgical measures in an ideal way. It is an important part of our step-by-step plan to treat osteoarthritis. The activity level of the patient as well as the grade of osteoarthritis is taken into consideration.

GOLDIC® - Therapy for disc herniation

“Herniated disc” means the gelatinous intervertebral disc tissue coming out of the intervertebral disc space between 2 vertebrae in the direction of the spinal cord. This is only possible if the fibre ring present around the gelatinous core of the vertebrae ruptures and the vertebra content bulges out through the rear longitudinal ligament through the canal of the spinal cord. The size and the position of the slipped disc can result in pain, sensation disorders and paralysis.

Herniated discs occur mainly in well-moving sections of the spinal column such as the cervical spine or the lumbar spine. These processes often present a very drastic and particularly painful event in the life of the patient. Due to these problems, quick action and effective treatment measures are desired.

Herniated discs do not need operation every single time!

With movement tests, a CT scan or an MRI, your doctor can determine the intensity of the slipped disc and suggest a method of treatment.

The **GOLDIC® - Therapy** is a great alternative, as operation (herniated disc operation) is not always necessary. Ask your doctor about this type of treatment.

The following descriptions of therapy success are exemplary and obviously irrespective of the individual situation of the patient.

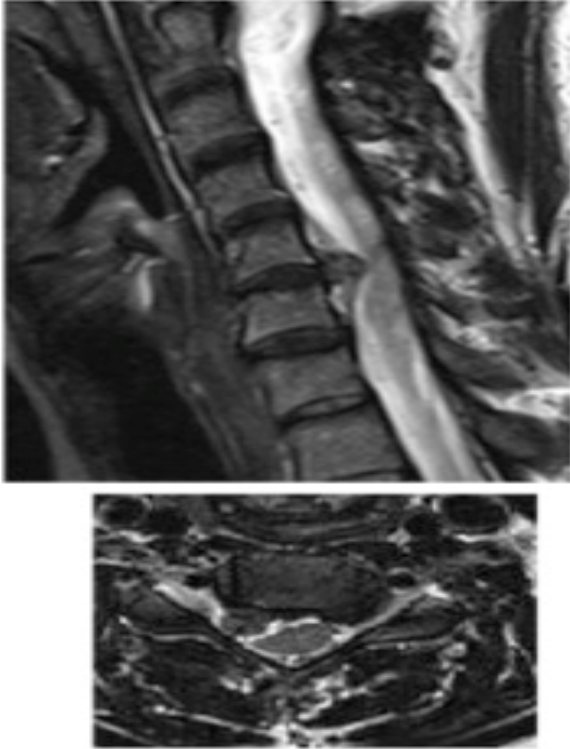
Trust your doctor, as he will find the right solution for your health problems.



GOLDIC® - Treatment – herniated disc – cervical spine

The cervical spine consists of various anatomical structures such as muscles, bones, ligaments and joints. Each of these structures have nerve endings, which can respond to possible problems with pain.

A slipped disc in the cervical spine can lead to pain in the neck, pain spreading to the arm, shoulder pain and feeling of numbness or tingling in the arm or hand. The intensity and nature of pain can be very different: ranging from dull, moderate and difficult to locate up to acute, burning and easy to locate.



Situation of a 55 year old female patient with herniated disc C5/C6 before GOLDIC® - Treatment:

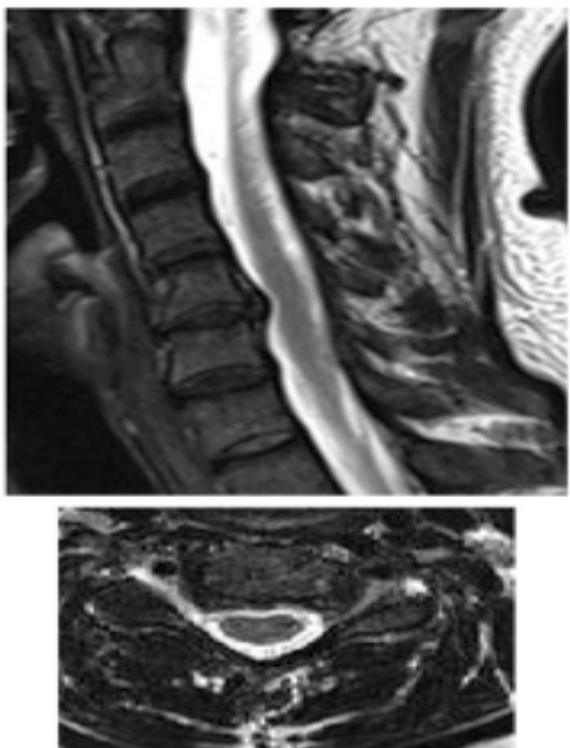
The outward bulge of the vertebrae tissue jutting out between the 5th and the 6th cervical spine is clearly visible. The herniated disc squeezes the nerve tracts in the canal of the spinal cord.

As the nerve tracts in the narrow bony canal cannot find their way, the pressure of the outward bulging disc causes pain, sensation disorders and paralysis in the affected segment.

This patient had substantial pain that could not be controlled even with the strongest of painkillers. In addition, she could not feel her right arm and had paralysis in the affected segment.

The pain was considerably reduced within just one week of GOLDIC® - treatment.

The loss of sensation and paralysis were rectified completely within 14 days.



Situation of the patient 1.5 years after successful GOLDIC® - Treatment:

The success of **GOLDIC® - Treatment** can even be seen very clearly in the follow-up of the nuclear spin tomography.

The former herniated disc has been reduced as far as possible, the compression of the nerve tracts is no longer detectable and the height of the intervertebral disc space is retained as it is.

An operation resulted in stiffening and loss of function of the affected intervertebral disc space.

Increased load on the related cervical spine segments with the risk of another slipped disc in these areas would be the consequence.

GOLDIC® - Treatment – herniated disc – lumbar spine

The lumbar spine has a peculiarity as compared to the thoracic spine and to the cervical spine: The vertebrae are placed especially steeply with each other. In a normal case, they can counteract forces that are directed forward or backward. Such forces appear first on bending forward or backward. Among herniated discs, L4 - L5 (lumbar spine) as well as L5 and S1 (sacral vertebrae) are affected first.

A herniated disc often causes pain the back first, which spreads later even to the legs and feet.



Situation of a 42-year old female patient before GOLDIC® - Treatment:

Here, a major herniated disc in segment L3/L4 can be seen. These responses in the area of the adjoining top and base of the vertebral bodies mean a chronic damage of the affected vertebrae segments.



Situation of the patient 1 year after successful GOLDIC® - Treatment:

A complete reformation of the former herniated disc can be seen. The vertebra still shows the reactive changes of the adjoining top and base as a sign of chronic damage to this segment. The height of the vertebrae segment is however retained.

Health is the sum of all illnesses that one does not have.

© Prof. Dr. med. Gerhard Uhlenbruck
(*1929), German Immunobiologist



Blood sampling

For venous blood sampling, blood is collected in the vein using a tourniquet. With an alcoholic disinfectant, the skin is disinfected at the puncture point. Using a sterile cannula, the vein of an arm is punctured and the **GOLDIC®** syringe is used. The buildup is released. According to the aspiration principle, the blood is collected in the vacutainer by pulling back the plunger. After collecting blood, the canula is withdrawn, the puncture point is squeezed lightly and it is covered with a swab or a plaster.



Serum processing

Serum processing is the most important step of the **GOLDIC® - Technology**. After the blood has been aspirated slowly and carefully into the four **GOLDIC®** tubes, the **GOLDIC®** injections filled with blood are stored for 24 hours in an incubator at 37°. Then, they are centrifuged to separate the serum enriched using the designed gold particles from the other blood cells. The important cytokines with growth factors and the serum enriched with key protein Gelsolin is then prepared for the injection of the patient.



Injection

The **GOLDIC® - Therapy** consists usually of 4 injections of the processed serum in an interval of 3-7 days. The serum is anti-inflammatory, it reduces the pain and activates and differentiates autologous stem cells and simulates the body's own **REGENERATION**. It is now injected into the affected joint, tendon or tissue.

In case of sensitive areas, administering local anaesthesia first is recommended.



Possible side effects

Drug-related side effects such as in case of conventional medicines do not occur. **GOLDIC® - Treatment** is well tolerated. Locally, it can cause temporary side effects at the treated point such as feeling hot, reddening and swelling. In very rare cases, over-sensitivity reactions have been observed.

Please contact your doctor for detailed medical advises.



Treatment and costs of GOLDIC® - Therapy

The treatment is currently (2015) not given in the services catalogue of GKV or PKV and is invoiced to the patient as a private medical service, complying with the Fee Regulation for Doctors (GOÄ).

Your trusted doctor will tell you about the options, risks, benefits and costs of the procedure in a personal consultation and based on individual test results.

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This brochure serves as information material for patient on the use of specific Arthrophen products and therapies. The contents of this brochure do not represent any recommendation for a specific form of treatment. The medical specialists should treat according to their experience and expertise and follow necessary medical literature or user manuals. The treating doctor bears the sole responsibility within medical freedom of treatment and based on a risk-benefit analysis that the use of Arthrophen GOLDIC®system is indicated to the respective patient.

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