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# NEXT GENERATION REGENERATION

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**GOLDIC®**

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PERSONALIZED  
MEDICINE

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# ABOUT US

## ARTHROGEN

We strive to improve the quality of life for each patient through compassion, dedication and innovative products designed to meet the individual needs of the patient.

Our search for new technologies is guided by the vision of understanding the body as a complex and integrated system.

The aim is to bring about positive changes at the molecular level of cells, tissues and organs in order to achieve appropriate reactions of the body.

A realization of this vision will enable us to find new design possibilities for innovative medical products.

We envision a future where a lot of what's currently done through surgery will be accomplished through an injection.

Where regenerative procedures are the norm, rather than the exception and where everyone has access to the safest and most effective treatments available.

We are working on the development and commercialization of bio therapeutic products based on new technologies that allow side-effect-free treatments in the autologous, i.e. the body's own system.

The focus of our research and product development is the treatment of inflammatory and degenerative diseases, which are among the most important human diseases from an epidemiological point of view of the socio-medical perspective and are thus responsible for the high cost burden of health and social security systems.

We want to improve the health and quality of life of patients - a goal we share with doctors, researchers and distributors around the world.

The vision of **ARTHROGEN** is to face the biggest challenges of modern medicine and to develop solutions for it.

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# 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.

Since the beginning of cultural history, gold has been equated with the sun. This is reflected in the symbolism and traditions of many peoples. The sun, the stars, the gods and medicine were seen in the “**total cosmos**” of mankind. The ancient Egyptians used gold for their buildings, for jewelry, for cosmetics and also for their medicine.

“**Aurum**“ had the same hieroglyph as „**sun**“. Gold played a significant role in alchemy in the Arabic and Persian region. In India, gold was cooked and in China people took it for life extension. For many peoples, it was an important part of sacred celebrations.

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.

Although the properties of colloidal gold have been investigated for over a century, their application as intracellular agents in living cells emerged only prominently a few years ago.

More fundamentally, these studies have reinforced the underlying concept in technology that **composition, surface design, size, porosity and shape are all critical to materials properties**, and that this translates into **a unique ability to interact with a biological system such as a cell**.

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**. Analyzing the actions of gold in the different phases of an immune reaction suggests that **gold plays an important role** already in the initiation, namely, the uptake and presentation of foreign anti-

gens. Thus, gold is taken up by the macrophages and stored in the lysosomes, which are called aureosomes, where gold inhibits antigen processing.

Moreover, it has been shown that gold suppresses NF-kappa B binding activity, as well as, the activation of the I-kappa B-kinase. **This mechanism results** in a subsequently **reduced production of pro-inflammatory cytokines**, most notably TNF-alpha, interleukin-1 and interleukin-6. On the subsequent T-cell level, gold has been shown to induce an up-regulation of IL-4 mRNA, resulting in a shift of the T-cell population to the Th2 phenotype. Moreover, the activation of T-cells is inhibited.

By **differentiating & activating local stem cells**, regenerating the structural cause of injuries and inflammation, **a more natural healing process** can take place.

This patented **GOLDIC®** technology **uses a special filter to prevent** these designed **gold particles from entering the patient's body** along with the processed 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 safety and efficacy of **GOLDIC®** has been clinically reviewed. It is a special type of **INDIVIDUALIZED MEDICINE**.



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# REGENERATION IS POSSIBLE

“**Regenerative Medicine**” is a very recent and highly promising field of modern veterinary and human 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, whether it is another human or animal.

The central focus of regenerative medicine is the cell, either human or animal.

After years of basic research, regenerative medicine is now beginning to represent a valuable tool to cure several clinical conditions in both acute injuries and chronic diseases.

Further research is mandatory to offer the definitive cure for both acute injuries and chronic diseases, but, first of all, physicians should be informed of these possibilities.

The physician of your trust will be pleased to advise you of the possibilities, risks, benefits and costs as part of a personal consultation and on the basis of an individual assessment for any kind of treatment.

**Regeneration** means “to bring forth again“. In medicine, this term refers to the functional and morphological recovery of a damaged tissue or organ by formation of new cells. Is derived from the Latin words:

re- = back, **generare** = generate

**Regeneration** may be **complete** (*restitutio ad integrum*) or **incomplete** (*reparatio*). The **ability to regenerate** tissue is **determined** by the **ability of its cells to divide**. With increasing differentiation of the cells, the regenerative capacity of a tissue decreases.

**Repair (Reparation)**. In medicine the term „*Reparatio*“ means the healing of damaged tissue by scar formation or granulation. There is a **difference** between repair „*Reparatio*“ and regeneration „*Restitutio ad integrum*“, which means the **complete restitution** of tissue function **without any remaining damages**.

**Healing** is the **process of the restoration of health** to an unbalanced, diseased or damaged organism. **Healing** involves the **repair** of living tissue, organs and the **biological system** as a whole and **resumption of normal functioning**. This could be supported, increased or fastened due to therapeutic measures.

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— **Complete healing without permanent scars or damage is called REGENERATION „restitutio ad integrum“** —

**Individualized Medicine** means that the patient’s specific information is used to achieve **greater diagnostic precision**, to identify and execute **better-tuned and more effective therapeutic regimes**, and, eventually, to achieve **speedier and longer-lasting recovery**. This kind of therapies include a **reduced probability of negative side effects** and an **earlier disease intervention** than has been previously possible.





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# INFLAMMATION

Can you imagine that there is a connection between a sports injury and a heart attack, gingivitis and stroke, a wound healing disorder and Alzheimer's disease or an infection and cancer? What sounds strange at first does indeed have a legitimate background, because the mentioned events and diseases have a common interface: **the inflammatory reaction.**

Recent medical evidence shows that an inflammatory condition is toxic to the body and is thought to play a major role in the development of cardiovascular disease, cancer, diabetes mellitus, gastric ulcers, inflammatory bowel disease, neurological disorders such as Alzheimer's disease or joint disease.

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## What is an inflammation?

To understand inflammation, to prevent it and cure is due to the complexity of the human body a huge challenge. A variety of diseases are caused by inflammation or go along with inflammatory processes. **Inflammation is a complex process to protect the body against injury and infection.** It is very important to realize the specific responses of the body to different inflammatory reactions; here is the key to the treatment of many common diseases.

It is the **response** to an **external or internal stimulus** with the **purpose of eliminating or inactivating it.** The **inflammation does not initially represent a disease.** Instead, it indicates that the body has initiated **a defense reaction of the immune system** with the onset of inflammation and the **healing process** is in full swing.

The **causes** of inflammatory reactions may be **biological stimuli** such as pathogens (e.g., viruses, bacteria, etc.) as well as **physical and chemical stimuli** (e.g., pressure, trauma, radiation, heat, cold, etc.) and much more.

**Inflammatory signs** include: **redness, swelling, overheating, pain** and **functional limitation.** There is no organ or part of the body that could not be affected by inflammation, and of course, there are differences in frequency.

Depending on the course of an inflammation, **acute, chronic, per acute** and **recurrent inflammations** can be distinguished.

In addition, physicians distinguish **inflammation by type of fluid** that collects in the affected tissue, the **serous** (protein-containing fluid), the **fibrinous** (fluid with blood plasma) and the **purulent inflammation.**

**Acute inflammation** occurs rapidly and over **three typical stages.** These serve successively to rid the tissue of the harmful substances, to **destroy the pathogens,** to **prevent their spread** and to **repair the affected tissue again.**

When **acute inflammation transitions into chronic inflammation,** physicians speak of the **secondary chronic variant** (e.g., bronchitis). A **primary chronic inflammation,** on the other hand, **does not arise from an acute one.** These **primary chronic inflammations include autoimmune diseases** (e.g., arthritis, rheumatism, Crohn's disease, multiple sclerosis, etc.).

Autoimmune diseases play a **special role** because the **immune system attacks and damages one's own body.** In an autoimmune disease, **the body fights itself mistakenly.** These diseases **can affect any organ system in the body** and therefore trigger completely different clinical pictures.



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# GOLDIC®

## WHAT IS IT?

**GOLDIC®** is our **platform technology** helping physicians for **treating different syndromes**. 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 autologous, anti-inflammatory and regenerative cytokines (proteins).

**GOLDIC®** stands for „**Gold Induced Cytokines**“

Cytokines are a broad and loose category of **small proteins** that are **important in cell signaling, regulating growth and differentiation of cells**. They play an **important role for immunological reactions and within inflammatory processes**.

**GOLDIC®** is **anti-inflammatory**, it **reduces the pain and helps to restore mobility**. Existing local stem cells will be **activated and their differentiation supported**. It stimulates the body's own **REGENERATION**.

Furthermore, using the **GOLDIC®** technology, important **growth factors** and **stem cell specific factors**, like **GELSOLIN**, **G-CSF** (granulocyte-colony stimulating factor) and **SCGF-β** (hematopoietic stem cell growth factor - beta) are **enriched to a significantly high degree**. This **increased production of Gelsolin, G-CSF and SCGF-β** in patients amounts to a **multiple of the initial concentration**.

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### Gelsolin, G-CSF and SCGF-β

**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. Scientists have found from extensive studies that **in all types of injuries, inflammations or degenerative processes this protein is severely reduced**. This also means that the **physiological concentration of GELSOLIN for maintaining health has a central meaning**.

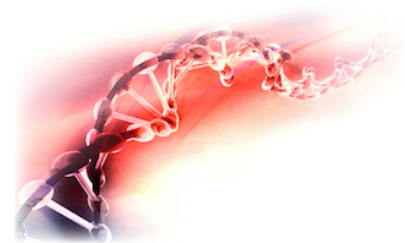
**G-CSF** stimulates the **survival and proliferation of progenitor cells**, which thus **helps with the activation of local stem cells**. In addition, **G-CSF** also **affects the granulocytes** (certain white blood cells, components of the innate immune system), because they also possess **G-CSF receptors**. These cells are **activated by G-CSF** and find the **chemotactic path to infection herds**, where they then **absorb and kill the bacteria**.

**SCGF-β** is a protein that **supports cell division and differentiation of blood cells** (for example, erythrocytes).

**SCGF-β** plays a decisive role in the **reproduction of hematopoietic stem cells** (hematopoietic stem cells reside in the bone marrow and have the unique ability to give rise to all of the different mature blood cell types and tissues) and **immature progenitor cells**.

The **combination of G-CSF and SCGF-β** leads to an **emigration of the adult stem cells** from the bone marrow and to an **on-site differentiation** where they are needed.

This **approach** is fundamentally **different from other stem cell specific therapies**. Among others, treatment with **GOLDIC®** can lead to an **increased production of these cytokines and other growth factors**, in the patients which amounts to a **multiple of the initial concentration**.



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## REGENERATION INSTEAD OF REPAIR

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# GOLDIC<sup>®</sup> MEDICAL DEVICE

The **physician of your trust** will be pleased to advise you of the possibilities, risks, benefits and costs as part of a **personal consultation** and **on the basis of an individual assessment**. The contents of this brochure do not represent any recommendation for a specific form of treatment.

Arthrogen and its affiliate are not offering **GOLDIC<sup>®</sup>** therapy as a cure for any condition, disease, or injury. This brochure contains no medical advice. All statements and opinions provided by these pages are provided for educational and informational purposes only.

**GOLDIC<sup>®</sup>** is a medical device which allows the doctor to produce an individual medicine. It is under his direct technical responsibility and for the purpose to produce a patient matched treatment for an individual application for a specific patient.



## INDICATIONS

Regenerative Medicine holds great hope for people with serious or incurable diseases. But the reality of these new therapies is complex. Except for a few areas of indication, stem cell research is still mainly in the early stages.

Today, the **main area of application** for **GOLDIC<sup>®</sup>** medical devices is in the **field of musculoskeletal disorders** (f.e. tendonitis, osteoarthritis, rheumatoid arthritis, back pain, etc.), **wound healing and orthopedic injuries**.

**GOLDIC<sup>®</sup>** works anti-inflammatory, reduces pain, restores mobility, activates and differentiates autologous stem cells and therefore stimulates body's own **REGENERATION** ability.

## TREATMENT

A typical treatment with **GOLDIC<sup>®</sup>** starts with **taking a sample of patients' venous blood**. The blood draw occurs **without** the addition of an anticoagulant or other additives.

This blood is now prepared using the patented **GOLDIC<sup>®</sup> - SET** which includes the designed gold particles and **a special filter** to avoid that these gold particles will be injected with the processed serum, later on.

Serum processing is the most important step. The **GOLDIC<sup>®</sup>** tubes filled with **patients' blood and gold particles** will be incubated for 24 hours and afterwards centrifuged to separate serum from the other blood cells. This serum enriched with growth factors and important cytokines, is then provided for injection.

The serum concentrate obtained is subsequently injected. One treatment usually consists of four (4) injections of the processed serum in an interval of 3 - 5 days.



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This brochure serves as information material on the application possibilities of specific ArthroGen products and technologies. The contents of this booklet are not a recommendation for a particular treatment. Healthcare professionals should act according to their education and experience, and may seek medical literature or instructions for use. Within the freedom of medical treatment and based on a risk-benefit analysis, the attending physician is solely responsible for the fact that the use of the ArthroGen GOLDIC® products is indicated for the respective patient.