# Matrix-Rhythm-Therapy

**Cell-Biological Basics, Theory and Practice** By Ulrich G. Randoll, Friedrich F. Hennig

*In the nineties the cell-biological matrix concept was developed at the University of Erlangen. Essentially biological systems are understood as complex regulatory systems. Humans are viewed from the perspective of system-theoretical findings, and symptom formations are represented as process derailments. The saluto-genetic, epigenetic view has become as important as the patho-physiological-genetic concept. Therefore reduction of motility and many symptoms of illness can be considered as regulatory disorder on a cell-biological level. By using this scientific approach medical and therapeutic areas of competence can find a plausible and completely new scientific basis. Out of this for the 21st century ground breaking medical approach matrix-rhythm-therapy (MaRhyThe®) has been developed.*

## Introduction

MaRhyThe® emerged from basic research within a clinical context over several years. Started as a consequence of partially unsatisfactory therapy results in day-to-day clinical work lead us to reconsider the practiced therapy methods. Patients with most severe diseases could not be helped anymore - in spite of using all the facilities of a university clinic. Based on newer epistemological models, we attempted to develop new therapeutic concepts, which led to experimental studies applying high-resolution video microscopy and consequently unexpected positive outcomes (1-4).

## Cybernetics, chaos theory and non-linear thermodynamics of irreversible systems

At the time concepts of cybernetics, chaos theory, and non-linear thermodynamics of irreversible systems inspired our experimental work with the video microscope. For the first time we could show cell processes in living human cell biopsies in high-resolution and record them live with video cameras (5,6).

One of our questions was which kind of waves applied at which frequencies and amplitudes promote recovery and enhance healing processes, and which ones may be harmful. Considering the spectrum of various physical therapies we asked which procedures seem to work non-specifically (chaotic, in the sense of disorganised frequencies) or specifically (creating order).

A possible principle for therapy with the aim of triggering the correct metabolism through a certain physiological pulse, to attain the well performing tissue, seemed plausible also from the perspective of chronobiology, synergetics and research of coherent fields (7, 8). The discovery that biochemical and biophysical cell processes are connected to both body-internal and body-external rhythms (9) got us onto the right track.

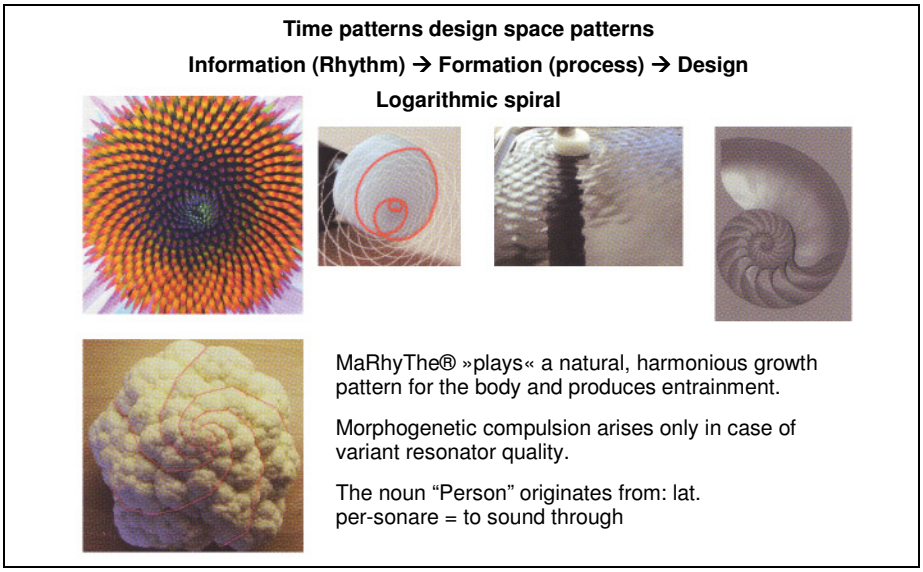


Fig. 1. The patented resonator (logarithmic spiral) couples itself into physiological processes free of stress (sympatholytical-vagoton) and fulfils the geometrical-fractal demands in reconstructing both lost biological time patterns (rhythm) and biological space patterns (structures).

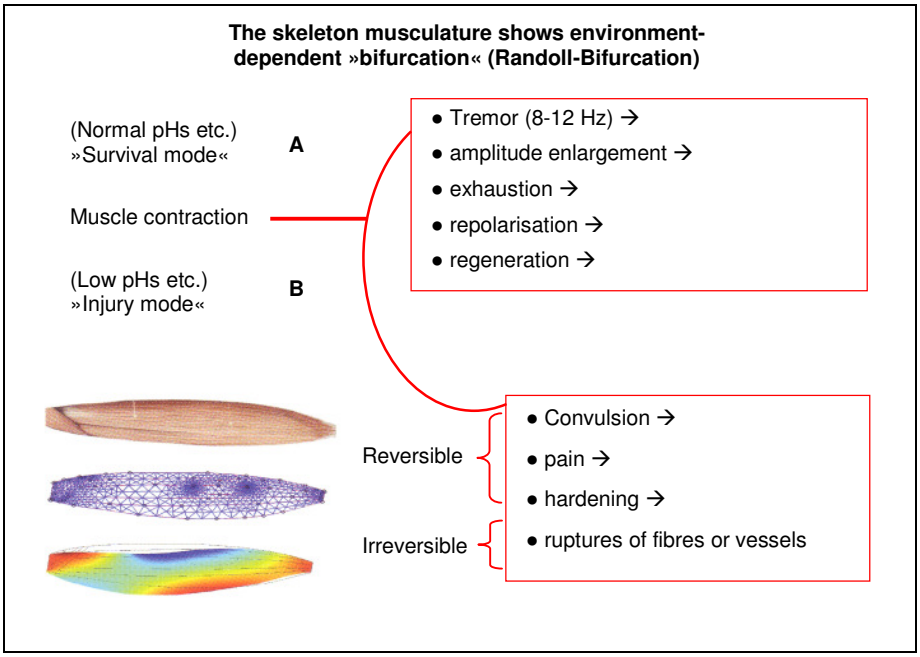


Fig. 2 Initial conditions - normal (A) or acidotic (B) - decide on the contraction process and the resultant muscle work = mass x acceleration x distance. The dynamic finite element model of the skeletal muscles shows typical contraction residues within the muscle belly.

## Proper rhythm for a healthy life

In systematically investigating body rhythms (fig. 1) we focused our queries on the skeleton muscle: Do all people shiver similarly and, if so, has this a physiological meaning?

In a doctoral thesis we applied piezo-sensors, so-called acceleration receptors (see glossary) (10) attached to the skeleton musculature and could prove, that rhythms increased, slowed down, or their intensity reduced and this correlated directly with pain sensation, induration or other states of illness. Healthy musculature synchronizes in a range between 8 to12 Hz (11, 12). Obviously, changed muscle elasticity and plasticity correspond to changed »logistics« on a cellular level (13, 18).

## The science of synchronism

Today, biological oscillators and their abilities to synchronise are examined in different research groups worldwide. The strong sensitivity of the synchronisation in regard to frequencies applied from the outside could be demonstrated. Apart from frequency windows, which lead to a very fast and strong synchronisation, there are always those, which have a contrary effect and destroy the synchronisation. Scientists emphatically refer to this potential danger (14-16).

## A new view of the muscle cell function based on non-equilibrium thermodynamics

Currently even experts consider the muscular contraction as a process that predominantly consumes energy; on the other hand the muscle relaxation is seen as a passive process. Paerisch & Randoll have revised this generally accepted opinion on energetic sequences of a muscle function (17) when they used the findings of non-equilibrium thermodynamics to explain the process of muscular functions. In order to be able to contract, a cell has to have built up a standby potential, a membrane potential. When this potential collapses, due to triggers from nerve signals, the intended contraction and muscular work follows. From the perspective of the muscle cell, this contraction, also referred to as depolarisation, is a passive process. A subsequent extremely fast restoration of the relaxed standby state, the repolarisation and therefore the relaxation of the muscle cell is from the perspective of the cell, the active and actually energy consuming part of the process. This reproduction of the thermodynamic non-equilibrium is dependent on the physico-chemical quality and quantity of the environment of the cell (the extra cellular matrix). The actual energy consumption during the process of muscle fibre contraction occurs through the removal of myosin from the actin-filaments and through the repolarisation of the muscle cell. ATP is therefore necessary first and foremost to achieve the relaxed standby state (i.e. resting potential).

## Muscle tremor, bifurcation behaviour and entrainment

Within the framework of our studies, we have found two tracks where muscle contraction can lead to depending on the initial extra cellular state. In analogy to certain models in mathematics we called this »bifurcation behaviour« (see glossary) (18).

1. If the conditions for contracting are normal, a muscle contraction passes from a physiological tremor through synchronisation of the discharge signals into a well-known muscle shivering (chills and fever, cold shiver, shivering with orthostatic collapse). Within the trembling-mode, the muscle cannot be contracted any further. The »window of frequency« in which the musculature synchronizes is valid for all people and is located within the range of the alpha brain waves (8-12 Hz). We refer to this as the »survival mode« (fig. 2). The skeleton musculature shows the bifurcation known in mathematics. Depending on normal initial conditions, the muscles at full tension switch over to the physiological synchronisation mode (survival tremor mode), or in case of acidotic initial conditions they cross over to the irreversible »injury mode« (Randoll Bifurcation), after passing through reversible intermediate stages (cramp, induration, pain). The dynamic finite element model of the skeleton musculature shows typical contraction residues within the muscle belly, resulting in a restricted elasticity or oscillation. With the finite element method, the oscillation dynamics can be computer simulated. By way of construction this trembling rhythm is inseparably linked with a maximum lymphatic-venous perfusion of the extra cellular space, from which the anti-oedematous effects can be derived. Obviously, the body attempts to protect itself against injury and dying off by focusing fully on perfusion. Simultaneously it centralises liquids in order to supply the vital organs.
2. If, on the cellular level, the muscle cells are already in an »energy crisis« through tissue acidosis, this will lead to visible indurations accompanied by pain. In this case a contraction will occur after depolarisation (19) and cannot be dissolved anymore for want of ATP-reproduction. If no ATP can be built up, because those physiological processes have moved to a 100 percent standstill, in extreme cases this will lead to necrosis and will activate rigor mortis. Acidosis sensitises the pain perception and the muscles' disposition to contract. This in turn can lead to the occurrence of spontaneous convulsions, even without an active nerve signal (20).

## Pain syndromes by contraction residues

At this time the cellular energy crisis is the most plausible patho-physiological model to explain the myofacial, myoacidotic and myotendenic pain syndromes. The compression of the venules and arterioles leads to an insufficient oxygen supply and reduced ATP-formation. If, as a result of hypoxia or an energy deficit on the cellular level the muscles fibres stay contracted, Paerisch & Randoll (17) speak of so-called contraction residues or leftover remanences. They can occur within the smallest muscle fibres, and can have a pain triggering effect. From these process disruptions originate further shortenings of the fascia system with resultant gliding-hindrances of the vessels and nerves which pervade the system leading to structural anomalies. Muscles can be consciously tightened and relaxed. Contraction residues however cannot be dissolved deliberately. Accompanying visco-elastic changes within the micro range of the muscles further lead to painful intramuscular dysbalances. Then contracted muscle fibres are not any more available for active motion. The variability of the motion pattern is restricted, and visible avoidance motions with protective postures and also growth disorder arise.

## Conclusion

The deficient energy metabolism at the cellular level must be normalised with adequate therapies. The cellular metabolism should be »rehabilitated« before subsequent macroscopic exercises will move and train the muscles. The causual healing of pain we term »re-adaptation of shifted dynamic equilibrium on a cell-biological level« and this healing must be activated at this level (21-24).

## Complementing and optimizing therapy

Given these findings a therapy emerged by which we intentionally can intervene on a cellular level in the process derailments: the matrix-rhythm-therapy. It is a contribution to physical therapy, which was always already a firm component of the regulatory and holistic medicine, but including today's scientific progress. Combining manual and osteopathic techniques prove to be extremely useful (25). In matrix-rhythm-therapy the resonator of the device (fig. 3) will be placed onto the areas to be treated and the physiological processes

are normalised by phase-synchronous, magneto-mechanical oscillations in a freely adjustable range of approx. 8 to 12 Hz. Our design allows the cell metabolism of the tissue to be reactivated with depth-effective rhythmical micro-extensions and the contracted areas of the musculature will be inductively relaxed (Circulation > Oxygen > ATP > dissolution of the tension).

On the basis of the biological importance of the body's own rhythmic systems of intact tissues, the Matrix-Rhythm-Therapy will depth-effectively insert coherent mechanical-magnetic oscillations into the body by means of the logarithmic spiral-applicator. Derailed, biochemical and physical processes linked with the rhythm will be reactivated or regenerated and re-adapted. The natural vibrations of the tissue are effectively activated by means of modulating micro-extensions. Here, the »effect of entrainment« will be used and body-own processes are re-adapted by rhythms within the well-defined window of frequencies. Many examples of microscopic and macroscopic »window effects« are described in the scientific literature.

In an actual statement concerning windows of frequency and entrainment Simeon et al. write (16): »As a consequence for the Matrix-Rhythm-Therapy one could conclude, that a deviation from the experimentally observed window of frequency of 8-12 Hz will possibly result in a reduction of the degree of synchronisation or coherence and could lead to a reduced effect or even to negative effects«.

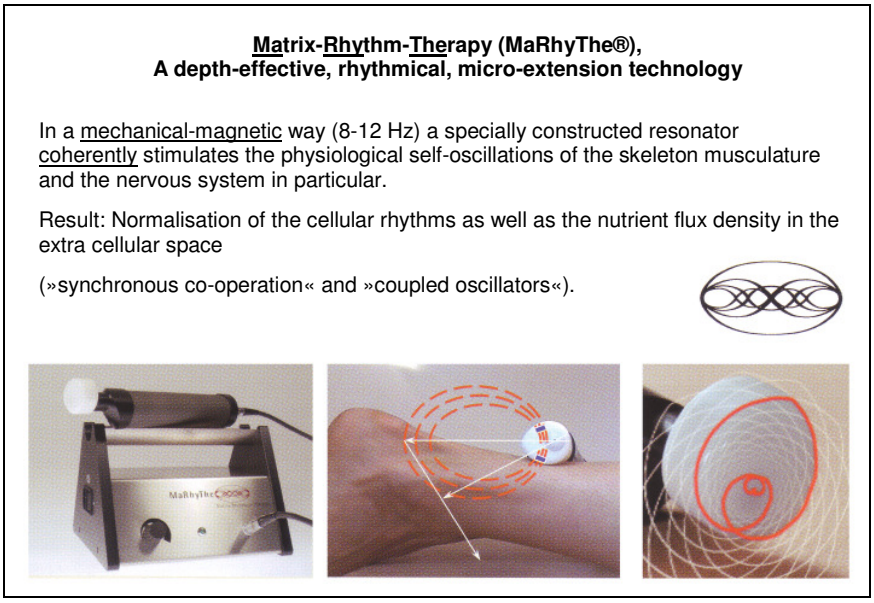


Fig. 3 Left: MaRhyThe-device; middle: magnetic field; to the right: specific harmonious wave pattern of the resonator which is manually applied to the tissue, and a rhythmic, logarithmic time pattern forms.

The MaRhyThe® stood the test in all cases where symptoms stem from microcirculation causes. Since its development matrix-rhythm-therapy is well established at the University Clinic Erlangen, particularly in the area of rehabilitation, for the prevention and reduction of damages after extreme stressing, injuries, accidents and surgeries, in high performance sports and in the veterinary medicine. The procedure is also applied in the prevention, and particularly to prevent pathological developments.

All illustrations by Dr. Ulrich G Randoll

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Supplementary pictures with detailed information will be found on the Internet at:

www.physiotherapeuten.de/exclusiv/archiv/2009/pt06_randoll_zusatzinfo.pdf

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Scientific findings of theory and practice from the project »Clinic-linked fundamental research« at the University of Erlangen 1989-97 can be looked up at:

www.matrix-center.com
www.marhythe-systems.de