

# VIBRATION AND CELL ACTIVITY – CELL ACTIVITY AND VIBRATION

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## Abstract

Vibrations and rhythms, as a result of organs and single cells, are well known in the field of clinical medicine. Also the meaning of their changes until a total stop (death), have been described for decades.

In cardiology and sports medicine for example it is well established to use time patterns (cell vibrations as a result of cell activity) for diagnostics.

On the other hand, to use time patterns (electrical, magnetical, mechanical /gravitational) specifically for therapy is new and still strange for some medical doctors, but opens the new field of vibrational medicine on the basis of “systems biology”.

Biophysics ( Synergetics, Cybernetics, non linear thermodynamic of irreversible processes, Chaos-Theory) of today gives the idea how biological structures are the result of physico-chemical processes, that are driven by body intrinsic and / or body external rhythms. Such bio-informative fields interact the whole span of life and stabilize dynamically.

In the early 90<sup>th</sup> researchers in the department of traumatology at the University of Erlangen-Nuremberg showed in high resolution videomicroscopes cellular oscillations depending from the biophysical environment. More and more it was recognized, that geometry is the informational link between time- and space-pattern.

They started to find out how far “basic evolutionary time patterns”, as natural conductor-frequencies are characteristic for healthiness and are disturbed in diseases and how far they can be systematically and continuously restored and brought back to a synchronous cooperation up to the macroscopic level again.

The result was to apply specifically basic frequencies from nature in the range of the gravitational fields (E. Gallasch 1997) and earth-ionosphere fields (O. Schumann 1957) with the aim to restore the tissues original “spectral resonance quality”.

Following this dynamic approach it was necessary to develop the Matrix-Rhythm-Therapy, a “Rhythmic Micro-Extension-Technique”, which uses the so far neglected time-structure (time-pattern) of the organism.

This innovation ( Matrixmobil® ) got the PCT and US patent and is ready for use in present day modern medicine. Clinically evaluated studies have been done in government rehabilitation-clinics of the LVA and also at DaimlerChrysler AG, Stuttgart.

## Actual therapeutic bases from new physics and cell biology

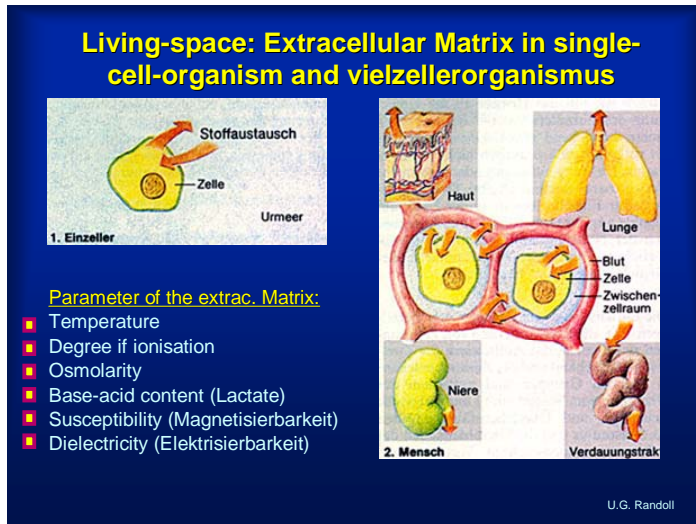
It is the progressive knowledge of the last decades, that focus on medical diagnostics and therapy by new branches of science, (cybernetics, synergetics, nonlinear thermodynamics of irreversible processes, chaos theory) again towards the cellbiological basis of life: [34, 7, 8, 18, 13, 33 ]

Cell biology teaches that all cells of the body are embedded into the extracellular matrix and its function and efficiency is depending on its condition. The extracellular liquid washes around the cells of the body like the growth medium around the cells of a cell culture. Not only nutrition and excretion (metabolism) regulation is required, but also for optimum performance differently

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proportioned physico-chemical and neurohumoral control signals are needed for individuated cell function.



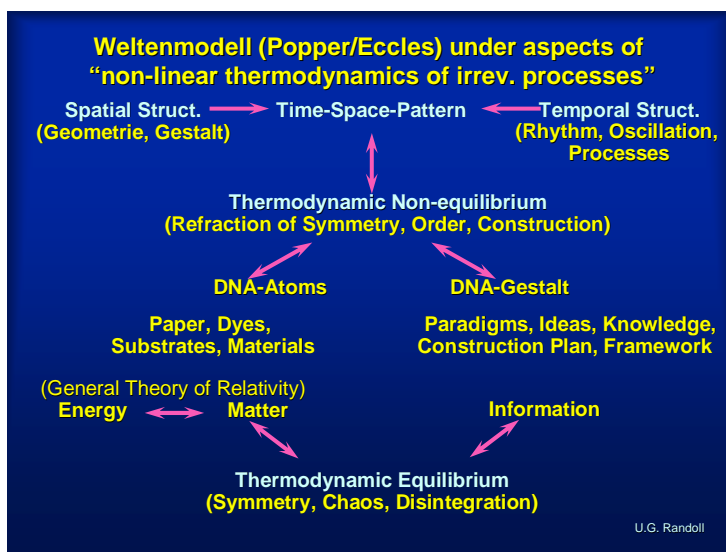
**Fig. 1:** Homeostasis of the extracellular matrix is guaranteed in single cell systems through the parameters of the “water” around them in addition to the detoxification organs in higher organisms.

Cell biology in the context of new physics brings the terms "time structure and time base" to new validity, whereby the life shows two time qualities:

First the linear expiration of time (linear time of the lifetime) and secondly the cyclic time (rhythmically, spiral and/or in a circle itself repeating time) into which lifetime runs off; as for example the heart minute volume, lung minute volume and also the neuromuscular signal transduction, which via rhythmic sensing rate steer the muscle movements. [16, 17, 2]

If a body is not able any more to produce "cyclic time" i.e. rhythms such as heart -, brain -, breath rhythm, this means medically that death occurred, because without rhythms physiological processes are visibly stopped for everyone, which is followed by death. Linear time and cyclic time are coupled and regarding diseases, the question arises how far an optimised cyclic time works against "material exhaustion" and so the linear time e.g. survival period of a tissue can maybe be extended with optimal life quality at the same time? [12]

Physiological processes develop biological structures with the three "ingredients of life", energy, matter and information and keep them alive by a *processive metabolism* outside of the thermodynamic equilibrium. Time coupled processes of life are therefore inseparably coupled to the space structures, so that humans are to be regarded in principle as a space-time structure. Each living person's structure keeps thereby an inevitable corresponding time base.



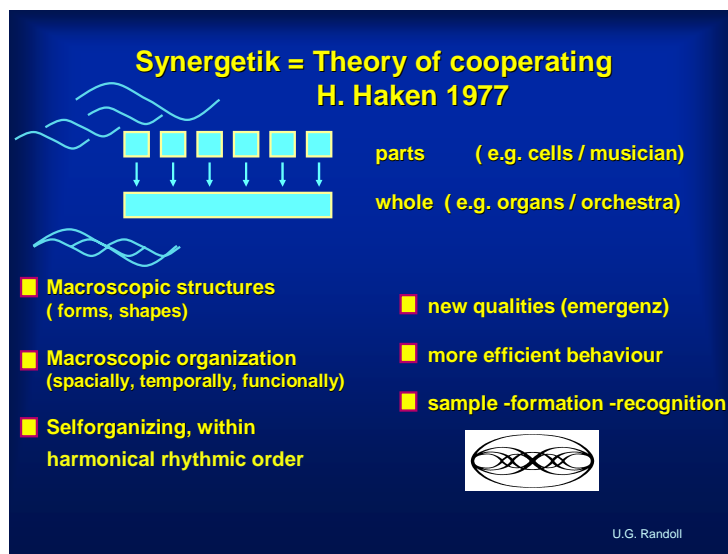
**Fig.2** Creation and Destruction of Dynamic, Rhythmic Structures, in regression from and progression toward thermodynamic equilibrium through the "ingredients of life": energy, matter, and information [Modified from the Popper Model of the Cosmos, Eccles 13]

Interestingly the body-intrinsic alpha-rhythm (7 Hz – 12 Hz in skeletal muscle and brain) correlate to gravitational fields (E. Gallasch 1997) and earth-ionosphere fields (Otto Schumann 1957) so that this “window” can be seen as “basic evolutionary time pattern”, as natural conductor-frequency range and “ordner” that sustains circulatory processes. As long as the “vibration qualities” (“Resonatorgüte”) of the tissues are normal, resonance couplings to external fields are possible.

Fröhlich H. predicts coherent and laser-like vibrations (rhythms) in the living matrix and characterizes from this point of view new physics biological systems as follows:

1. They are relatively stable but far away from the thermodynamic equilibrium.
2. They exhibit a non-trivial order
3. They have extraordinary dielectric properties [4, 5, 6]

This **macroscopic coherent rhythm** existing in organs can be pursued in video microscope studies of living biopsies up to cellular level and is under aspects of “synchronism” and “synergetic” the result of cooperating individual cells, which are united to an organ. [9, 19, 20, 21, 22, 23 ]



**Fig. 3:** Organization of mass is not linear. Threshold values accompany different levels of organisation in time and space. Cells are cooperating harmonious like the musicians in an orchestra.

To such coherent rhythms coming from fractal dimensions, the physiological processes (e.g. pulse wave) are coupled inseparably. They can be measured in different qualities (electrically, magnetically, mechanically, optically, acoustically ). In the medical diagnostics of today the meaning of rhythms for most different organ-specific diseases is recognized - not so however for medical therapy. [24]

To get therapeutic treatment effects it is necessary to apply vibrations (rhythms) softly modulated and never in one fixed frequency number as biological systems oscillate in “frequency–windows”. Contracted and fixed tissue areas have to be systematically and continuously restored (micro-extended) and brought back to a synchronous cooperation up to the macroscopic level again.

### **Diseases as a loss of rhythm, process degeneration or illness of the structure?**

If structures of the body are injured, for example by an acute trauma like an open fracture, they are treated by surgery (structure management). Implicit and presupposed as a part of healing, underlying micro processes, being linked to the time structure, (rhythms), begin to structure and self-repairing micro areas controlled from within (self organizing).

If micro-processes however do not readapt and come in cooperation automatically (selfintacting), i.e. if the time base of the micro area itself remains disturbed, then it comes to the well-known different symptom formations of the macro range (diseases) like chronic pain, circulation disturbances, movement restrictions, neurological losses, wound healing disturbances etc..

## Physical therapy as cellbiological process management

If such disease pictures are understood as "expressions of the moment" and cutouts of a decompensated cellbiological process, which makes itself successively visible also in structures, it is meaningful to work against these pathophysiological processes in time and to readapt them.

For the re-adaptation of a functional and structural "*Restitutio ad integrum*", historically seen natural, physical, osteopathic or manual-therapeutic measures prove useful at all times. The goal was and still is to revive the micro-rhythmicity and readapt the micro circulation coupled to it by more or less specific stimulation-therapies in order to again arouse the regulatory physico-chemical processes coupled to it (process management).

Injuries for example can be of different genesis, but need however on the way to healing a feedback of the rhythms, processes and structures from all levels to regain the harmonious original situation.

From Chaos Theory it can be concluded that the more purposefully (harmoniously) micro rhythms are applied, they more they directly become effective as geometrical order and preformed pictures already in "water" (later replaced and condensed by tissue specific molecules) on a molecular level and couple at the same time to existing micro processes of most different physiological qualities. (entrainment). [1, 3, 11, 32]

With *integration* of physiological "attractors" physical medicine becomes effective.

## Purposeful Readaptation with the "MaRhyThe" for diseases

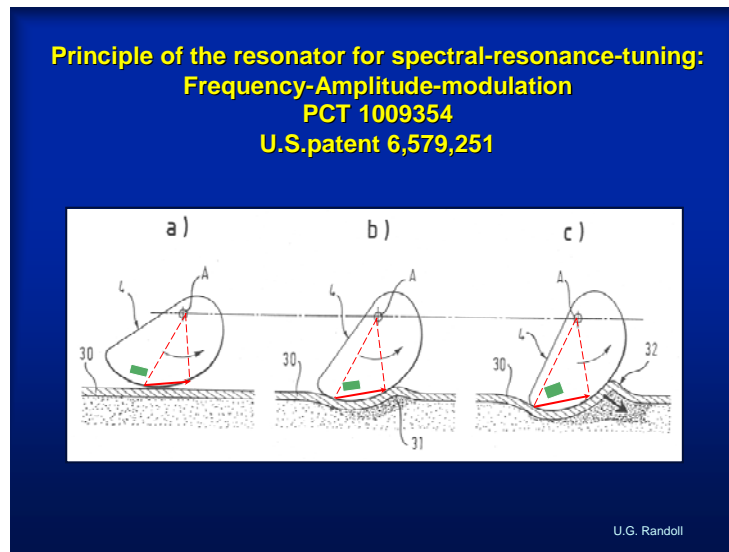
If tissue with rhythms and/or vibrations is to be subjected to physical therapy which is process-optimizing preferably those are of importance, that the tissues are themselves able to produce under physiological ( healthy ) circumstances. Of central importance the rhythm is in the range 8 - 12 cycles per second. It corresponds to the alpha rhythm of the brain and also in space medicine it was recognized as "gravitation-strength-dependent" resting beat frequency for the entire organism". As H. Rohracher (neuropsychiatrist, Vienna) already determined in 1959, and in recent research at the University of Erlangen, to be confirmed, there are no rhythmic skeleton muscle movements in humans which are greater than 18 cycles per second. [17, 31] Research results show that from these quiescent vibrations the skeletal musculature is in the situation in this frequency range to synchronize whereby during increasing muscle strain first an amplitude reinforcement occurs (building to muscle tremors), which then changes, sliding into an exhaustion condition of the musculature. [15]

Therapeutically this frequency window is focussed on by **matrix-rhythm-therapy**, a specific vibration-therapy to support life specific "**synchronism**". Linking is effected via a particularly developed resonator, which produces coherent mechano- magnetic waves. (Fig. 4)



**Fig.4:** Left: Matrixmobil; Middle: Magnetic field ;Right: Specific harmonic wave-form from the resonator, mechanically linked into the tissue (colloidal liquid crystal body).

The therapist obtains a holistic resonance spectral tuning through the skin and the skeletal musculature with accompanying fasciae, by frequency and amplitude-modulating. This unfolds its relaxing effect even in the finest single structures in the inner body. As a result of the therapy the resonance quality of the total body is subjectively noticeable and objectively visible.



**Fig.5:** The Logarithmic' spiral produces different path speeds with the same angular speed on the skin-surface. From this resulting pulling moments, stretch probably-proportioned, underlying tissues e.g. fasciae on their origin length and stimulate at the same time the stretch-sensitive feeling organs (spindle receptors) being dependent on  $dL/dT$  as well as absolute length increase (PD sensor). By stimulation of the tension-sensitive feelers (PD feelers) in the Golgi-tendon apparatus, the  $\alpha$ -motoneurons of the concerned muscles become restrained, whereby one works against the tension development in the muscle (autogenous inhibition).

We need to make sure that the total resonator quality of the tissue is repaired including the proprioceptors ( muscle spindles, Golgi tendon apparatus).

A healthy organism needs for body movements in peace (vagus), as well as with max. demand (sympathicus) - the full harmonic spectrum.

### **Effect mechanisms of the MaRhyThe with diseases**

1. Normal presentation of the swinging resonator produces a wave sample, which spreads more circular in the whole body. (Fig 4 right)
2. The depth effect is strengthened by increasing of the pressure as well as by rotation of the resonator, since the stroke becomes larger due to the longer radius. Depth effect means pressure on the tissue and the vein- and lymphatic vessels which are under it, whereby over the anatomical construction (flap mechanism) within the tissues a "milking effect" results, i.e. intravascular suction at the capillary bed of all tissues develops. Acidotic, swollen tissue is pH-normalized, vessel membranes repolarise, so sealing again and an internal pressure with normal flow rebuilds itself, so pain disappears.
3. From rotation results an acceleration and a longitudinal load, to be individually dosed at the musculature, which permits a purposeful linking into the alpha-gamma motoric (spindle organ) on the one hand as well as to Golgi tendon apparatus on the other hand. By a subliminal sympatholytic and/or vagotonic stimulation of the proprioceptive field, imbalances resolve themselves also in the fasciae whereby the tonus of the tissue is generally normalized and the resonator quality increased. The "sensors" are brought back into the "zero-position" given by the gravitational field. By cutivisceral links, internal organs show parallel sympatholytic and/or vagotonic effects.
4. The rhythmically released piezoelectric effect at all collagen fibres including the tendon and nerve tissue lead, together with their pyroelectric characteristics, to a re-establishment of the longitudinal electrical polarization. This affects arrangement of the individual tropocollagen molecules and is a condition for scar-free restructuring e.g. from tendon tissue and all other tissues made of collagen.
5. Phased synchronously to the mechanically reciprocating alternating field a magnetic field links inductively into the tissue, whereby in the compartments of the body being

electrolyte-rich an alternating voltage develops. In particular it works on the blood, Lymph and secretion systems as well as in the nerve and muscle system.

6. The MaRhyThe passively opens the entire vibration spectrum, which actively encourages flexibility of nerves and other tissues, and the entire movement apparatus develops.

Symptoms with sport injuries for example show up in the entire spectrum from structure destruction to functional imbalance or individually noticeable existential orientation failure.



**Fig.6:** With calf training at the leg press the calf muscle tore. Left: Musculature in the not actively contracted condition. In the middle: Leg rh. MRI cuts of the calf musculature with clear findings. Right: Relaxed one, homogeneous swinging musculature after therapy. After altogether 5 applications over three weeks training was resumed.

Tissues with myogeloses, fibroses, scleroses, scars or contraction tears are mobilized and regain access to the "master clock frequency" (8-12 cycles per second) Obviously there are powerful synchronizing rhythmic motions that are meaningful for living tissues and can be used therapeutically.

### **Momentary results:**

The matrix-rhythm-therapy, (PCT and US patent) reintegrating the so far neglected time-structure (time-pattern) of the organism, was tested for over seven years after its systematic development at the Erlangen University Clinic.

Rhythm application is expressly meaningful both in prevention and in rehabilitation after overloads, injuries, accidents and operations as well as pain therapy. [10, 25 - 30]

Today this method is integrated as basic treatment module in all kind departments (more than 900 clinics and offices) working in the field of cell-biological process-management even in horse-sports-medicine. [14] Studies have been done for evaluation in governmental rehabilitation-clinics of the LVA and also at DaimlerChrysler AG, Stuttgart.

Starting as it does with the systematic healing of micro processes, matrix rhythm therapy applied by the Matrixmobil® is an ideal tool that can complementary be combined with osteopathic and other manual therapeutic approaches.

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