Models and experimental findings relating to the "memory" of water and their significance for the bioresonance method

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1. Introduction

All organisms have a high water content when in an active state of life. The adult human body consists of approx. 70% water. Water molecules even represent approx. 99% of all the molecules which make up an adult body. Consequently nucleic acids, proteins, lipids, vitamins, hormones and all the other important molecules only account for approx. 1% If plant organisms pass into a latent state of life, such as that found in seeds, then their water content drops to approx. 15% On the other hand, a loss of 1 -2% water would pose a serious threat to the human body.

Water is able to dissolve more substances than any other solvent. It is particularly dense with exceptional surface tension and is an excellent heat reservoir. Most substances have a permittivity of between 1 and 8 while the figure for water is 80. As a result, ionisable substances dissolved in water exhibit a high degree of dissociation which forms the prerequisite for their physiological effectiveness (cf. Rothe, 2012). The properties mentioned cannot be extrapolated from the properties of similar compounds of water, the hydrides in the sixth main group of the periodic table: while, for example, the boiling point of H2Te, H2Se and H2S lies below zero degrees Celsius, water (H2O) boils at +100°C, as is well known.

Consequently a deeper understanding of cellular and organismal processes requires an appreciation of the properties and capabilities of the medium water. An important starting point in this context are possible structural properties of water and its "memory", the ability to store electromagnetic frequencies.

2. Structures of water

2.1 The water molecule

A water molecule consists of two hydrogen atoms and one oxygen atom bonded together. The two hydrogen atoms are positioned at an angle of 105° to the oxygen atom. This arrangement including the atomic proportions can be illustrated by a space-filling model. As oxygen is 1.4 times more negatively charged than hydrogen and the two H atoms are positioned on one side of the oxygen only, the molecule has a permanent dipole moment. Nevertheless water is outwardly neutral.

The space-filling model of a water molecule is a rigid model. However the three atoms represent oscillating systems. The energy for these oscillations comes from the atoms themselves. So it is inherent and leads to natural electromagnetic frequencies. Atomic nuclei oscillate in the microwave range while electron plasma oscillates in the hertz and kilohertz range. The distance between the H and 0 atom also pulsates. It leads to an electromagnetic oscillation in the infrared (IR) range at approx. 10^{14} Hz, corresponding to a wavelength of approx. 3.2 micrometres.

The angle between the 2 H atoms also pulsates and this generates a frequency in the distant IR; the two H atoms also revolve around their own axes (cf. Ludwig, 1999).

According to Ludwig (2000), oscillation of the distance between the H and 0 atom

takes a modulated form. This means that the microwave radiation emanating from the distance oscillation can absorb low frequency electromagnetic frequencies and carry them further. The distance oscillation can therefore act as a carrier wave for information in the hertz to kilohertz range. Numerous frequencies relevant to biology can be found in this range. This system is similar to that of analogue radio.

2.2 Cluster formation

Water molecules can form groups or clusters due to their dipole nature. This takes place through the formation of hydrogen **(H)** bridges between the individual water molecules. Various oligomers can develop in this way, as well as larger water clusters. Consequently liquid water has an internal structure. Groups of ordered water molecules occur alongside disordered water molecules. As early as 1933, Fowler and Bernal advanced the idea of microscopic structures being formed in water, based on X-ray analyses.

2.3 Microscopic states

Most of the models of the structure of liquid water are based on two different microscopic structures. These are believed to consist, on the one hand, of a lower density more strictly ordered structure similar to ice and a higher density, less strictly ordered structure. Both structures apparently exist in a temperature- and pressure-dependent equilibrium so that they are in a constant state of formation and degradation (Carlton, 2007). The equilibrium can also change under the influence of ions as these display different solubility in the two water structures. In addition, individual water molecules still also exist. X-ray spectroscopic test results and the intrinsic luminescence of liquid water support these assumptions (cf. Tanaka, 2000; Carlton, 2007; Wiggins, 2008).

2.3.1 The solubility of salts

The size of a dissolved substance determines in which of water's microstructures it prefers to dissolve. The following monovalent cations display a decreasing preference for lower density water:

Cs+ > > Na+ > Li+ > H+

Cs+ und K+ behave here like chaotropic ions while Na+, Li+ und H+ act like kosmotropic ions. Chaotropic ions have a destructive effect on water clusters while kosmotropic ions stabilise them (Wiggins, 2008).

The following monovalent anions also dissolve in preference in lower density water:

J , Br , Cl^-, HCO_3 , H_2PO_4 , HSO_4

These anions behave in a chaotropic manner while F reacts kosmotropically.

2.3.2 Hydrophilic microcaverns

The varying solubility of ions in lower density or higher density water can lead to the synthesis of chemical compounds if the ion concentration does not exceed a certain level and the clusters are spread differently over free water and hydrophilic microcaverns. Lower density water clusters accumulate in the microcaverns (d 20 nm) of a cellulose acetate membrane, for example (Wiggins, 2008). The synthesis of adenosine triphosphate (ATP) from adenosine diphosphate (ADP) and phosphate (Pi) (ADP + Pi = ATP) can take place spontaneously in the microcaverns of a cellulose acetate membrane. However this only occurs when potassium ions are also present in the form of KCl or KH_2PO_4 and the concentration in the external medium does not exceed 10 millimoles. The release of ATP from the membrane could be the result of a transition from lower density to higher density water, since KH_2PO_4 and KCl trigger this kind of transition. NaCl and $MgCl_2$ prevent the formation of ATP in the membrane. Synthesis lasts several days.

2.3.3 The coherent domains model

According to ideas and calculations from quantum electrodynamics, in the temperature range from 0-100°C, water molecules constantly form groups in which all the water molecules oscillate synchronously (simultaneously). These groups have been described as coherent domains (Preparata, 1995; Del Giudice and Preparata, 1994). Coherent domains can arise through water molecules passing from their normal state into a less ordered state. The transition supplies the energy needed to stabilise the coherent domains. The normal state differs from the excited state, in which all the water molecules oscillate coherently, by 12.06 eV excitation energy. This energy typically comes from a photon. Its wavelength is obtained from the excitation energy using the formula

A = h c/E,

where

A = wavelength (m)
h = Planck constant (4.136 x 10' eV sec)
c = speed of light (2.9978 x 10^8 m/sec)
and E = energy (eV).

A photon with excitation energy E = 12.06 eV therefore has a wavelength of A = 103 nanometres, which corresponds to a frequency of v = 2.91 x 10^{15} Hz. The wavelength of the stimulating photon is therefore 1000 times larger than a water molecule measuring = 0.1 nanometres so that several hundred water molecules in liquid water can be excited at a time by one single photon with this energy, i.e. one and the same photon can trigger a collective state. If a coherent domain is formed the photon remains trapped inside. Under certain circumstances other photons in the background also remain trapped in a coherent domain, creating a sizeable field. A field of this kind has an energy of 0.26 eV, corresponding to a frequency of 6.3 x 10^{13} Hz, or a wavelength of A = 4.76 x 10^{-6} m. The wavelength of the absorbed photon measuring 103 nanometres corresponds to a frequency of v = 2.91 10^{15} Hz. As a result the frequency of the enclosed electromagnetic field is smaller than that of the free field with the same wavelength.

Consequently a coherent domain owes its stability to the energetic benefit derived from its coherent state, which can be traced back to the interaction between the water molecules and an electromagnetic field of appropriate energy. The coherent oscillation prevents a coherent domain dissociating through the effect of heat.

In a coherent domain measuring == 75 nm in diameter, approx 5.5 million water molecules oscillate coherently at room temperature and the domain contains approx. 700,000 free electrons. Coherent domains thus act like reducing agents (electron donors). Non-coherent water, on the other hand, ads as an electron acceptor (oxidising agent). The density of coherent domains is 0.92, equivalent to the density of ice. They decline in number as the temperature increases (Del Giudice and Giuliani, 2010).

Viscosity in coherent domains is reduced at room temperature and resistance to ion migration decreases. Ions may be involved in the coherent oscillations of water molecules.

According to the findings of C.W. Smith (personal communication), even larger domains may also develop as well as concentrically layered domains. Each of these areas can store its own spectrum of electromagnetic fields. Several coherent domains can oscillate in phase. A cubic centimetre (1 cm^3) of water is capable of absorbing up to 1000 different electromagnetic frequencies (Smith, 2013).

3. Imprinting electromagnetic frequencies in water

3.1 Water's "memory"

By water's "memory" we mean its ability to absorb electromagnetic frequencies and store them over a prolonged period. This "memory" is non-abelian (AB # BA). There

are frequencies whose action excites and others with an inhibiting effect. If water is held in an open vessel 21 cm long or in a 10 cm cuvette, it is not possible to imprint frequencies (Smith, 2001). The liquid state of water presupposes that the "memory" is non-local (Smith, 2001). Molecules generally emit both exciting and inhibiting electromagnetic frequencies which can be imprinted in water. The "memory" is extinguished if water is boiled for 10 min or screened from the earth's magnetic field by a metal beaker so that the strength of the earth's magnetic field is reduced to less than/equal to 380 nT (Smith, 2004). Various methods have been developed to imprint electromagnetic frequencies in water.

3.2 Simple methods

Electromagnetic frequencies which are stored in water can be transferred to "pure" water.

The simplest method is to add a small quantity of informed water to a larger quantity of water (cf. Endler et al., 1996). This water can then in turn be used to transfer information. The water should be stored at a cool temperature in amber glass bottles but not in the fridge (Elster, 2006).

Another means of transferring electromagnetic frequencies is to place a glass of informed water inside a glass containing "pure" water. High frequencies are transferred quickly while low frequencies take hours or days (Smith, 1995).

A glass of informed water can also be placed next to an equal sized glass of "pure" water and the pure water briefly exposed to a strong magnetic field or the glass of informed water briefly tapped on wood (Smith, 1995).

3.3 Technical methods

A substance's electromagnetic information can also be transferred to pure water by technical means, e.g. using ultrasound (Sukul et al., 2002) or pulsating high voltage (Jerman et al., 2005).

Electromagnetic information was transferred from the substance 4- phorbol-12-beta-myristate-13-acetate, which causes respiratory burst in neutrophiles in human blood, to the cells using a conventional audio amplifier (Thomas et al., 2000).

3.4 Potentisation

The process of creating homoeopathic potencies begins with a mother tincture. Mother tinctures represent mixtures of equal parts of plant juices with 86% ethanol, for example, or they are extracts from plants, animals and their components with liquid vehicles (cf. Homoopathisches Arzneibuch [Homoeopathic Pharmacopoeia], 1985; HAB, p.21). These mother tinctures are then potentised. Potentisation involves diluting the initial solution and then shaking it vigorously (succussing) in an up and down movement. In homoeopathy this process is repeated numerous times in succession with dilutions often in a ratio of 1:10 or 1:100 using a glass which is 70% full. 43% ethanol frequently serves as the diluting agent.
D potencies equate to dilutions of 1:10 with subsequent succussion, while C potencies are dilutions of 1:100 with subsequent succussion at a predetermined strength and frequency (cf. Rothe, 2012).

4. Electromagnetic structural images

As already explained in connection with the water molecule, chemical substances have a series of electromagnetic frequencies even if these are of extremely low intensity and cannot be easily determined. These frequency patterns can be referred to as electromagnetic structural images (Strube, 1987). They can be attributed to the spin frequencies of molecules. Spin frequencies are generated in particular by elementary particles, protons, neutrons and electrons as well as the atomic nucleus. These can all be thought of as small rotating bar magnets which spin like tops. They spin of their own accord thereby generating a magnetic moment. Now, within molecules, there are

spins which are not influenced by an external magnetic field (couplings of nuclear and electron spins) and those (the remainder) which are influenced by external magnetic fields, including the earth's magnetic field (Strube, 1987). The deflection of spins in molecules by external magnetic fields leads to corresponding electromagnetic resonance frequencies. This might be the reason behind the formation of electromagnetic structural images. The electromagnetic structural images of molecules mean that each molecule has non-local molecule information, i.e. electromagnetic information which is not linked to the site of the molecule (Galle, 2002).

5. Human electromagnetic frequencies

5.1 Ting acupuncture points

The bioresonance method has already long been used to diagnose and treat the human internal organs by means of the acupuncture points (cf. Galle, 2002). The method is based, firstly, on the electrical properties of the acupuncture points and secondly, on the fact that the Ting acupuncture points are linked to the internal organs by special channels (Bonghan ducts) (van Wijk et al., 2007). The Ting acupuncture points on the human skin are 10-100 times less electrically conductive than those of the surrounding skin. Changes in conductivity at these points can be used to diagnose changes in the state of health of the organs with which they are associated. In addition introducing medications, including homoeopathic remedies, into the measuring circuit can serve to check their effect on an acupuncture point and thus on an internal organ.

Acupuncture meridians carry two frequencies which are in a certain relationship to one another. These are the same frequencies which can be measured on microscopic preparations of the target organs (Smith, 2013). **Table 1** shows the frequencies at acupuncture points beneath the toenails (Smith, 2004).

The stomach meridian behaves abnormally. Its frequencies differ by a factor of 10, measured on the right and the left foot; the ratios differ by a factor of 10, yet the geometric means fit into the general ratio. Excluding the stomach meridian the mean ratio from high to low frequencies is $(48.8 \pm 4.2) \times 10^6 \pm 8.6\%$); the paired correlation coefficients amount to 0.9953. The range of measured values is relatively large (Smith, 2004).

The frequencies at an acupuncture point can be transferred to water. For this a fine tipped pipette filled with water can be placed with its tip on the acupuncture point until the water makes contact with the surface of the skin. A permanent magnet is then brought close to the pipette to imprint the frequency. The pipette is then removed and the frequency in the water measured (Smith, 2004). Living systems use frequencies of at least 1 millihertz to 1 gigahertz (Smith, 2004).

The occurrence of two frequencies, a lower and a higher frequency, goes back to the phenomenon of coherence.

In living systems the frequency indicator which can be measured is not a composite of all the molecule frequencies of a system but only those frequencies which are most important at a given time (Smith, 2013).

5.2 Electronic medication test

The medication test can be carried out with a bioresonance device as follows (Morell and Rasche, 1976).

The test subject takes a pencil electrode in their left hand. This electrode is linked to a brass honeycomb which is in turn linked to a bioresonance (resistance) measuring device. The cable from the measuring device leads to a pointed electrode which the investigator presses against one of the subject's acupuncture points. The measuring instrument is switched on and the resistance at the acupuncture point measured.

Table 1: Electromagnetic frequencies at acupuncture points and their target organs

Feet

Ting	Frequencies (Hz)		Histological sections		
Acupuncture point (target organ)	low	high	Tissue	Frequencies low	high
Big toe *Inside,* PnI (Spleen, pancreas)	5.61×10^{-2}	2.76×10^{6}	Spleen	5.60×10^{-2}	2.70×10^{6}
Outside, Liv1 (Liver)	$4.65 \times 10^{\circ}$	2.25×10^{8}	Liver	$4.73 \times 10^{\circ}$	7.10×10^{8}
2nd toe *Inside,* JD1 (total degeneration)	2.82×10^{-1}	1.45 x 10'	Vertebral disc	3.32×10^{-1}	1.44×10^{7}
Outside, St45 (Stomach)[1)]	4.43×10^{-2}	2.14 x 10'	Duodenum	4.45×10^{-2}	2.20 x 10'
Middle toe *Inside,* FibD1 (Fibroid degeneration)	8.0×10^{2}	3.9×10^{10}			
Outside, Skl (Skin impairment)	3.58×10^{-3}	1.73×10^{5}	Skin	3.55×10^{-3}	1.82×10^{5}
4th toe *Inside,* FatD1 (Lipocatabolism)	7.45×10^{-1}	3.62×10^{7}			
Outside, GB44 (Gallbladder)	5.10×10^{-2}	2.43×10^{6}	Gallbladder	5.13×10^{-2}	2.38×10^{6}
Little toe, *Inside,* Ki (Kidneys)	9.50×10^{-4}	4.70×10^{4}	Kidneys	9.55×10^{-4}	4.74×10^{4}
Outside, BL67 (Urinary bladder)	$5.54 \times 10^{\circ}$	2.70×10^{8}	Urinary bladder	$5.61 \times 10^{\circ}$	3.90×10^{8}

Acupuncture points as named by Voll. [(1)]Right foot (Smith, 2003; Table 8, page 28).

If the reading on the display is above or below the standard value (50 scale divisions), a medication, test ampoule or homoeopathic remedy is placed in the brass honeycomb and the electrical resistance at the acupuncture point measured again. If the reading returns to the standard value, then the medication has a positive normalising effect. If the resistance remains unchanged then the medication has no effect. If the reading rises above or drops below the value initially measured, then the medication has a negative effect. This type of test clearly shows that molecules have an electromagnetic effect, just as homoeopathic remedies do.

The assumption that homoeopathic remedies derive their effect from specific electromagnetic oscillations was investigated by Morell and Rasche (1975, 1976) using a radio connection which operated according

to the principle of analogue wireless. For this they used a transmitter which generated a carrier frequency in the megahertz range and placed this with its bearing plate on a medication ampoule, a series of ampoules, an ampoule box or medications in droplet or tablet form. As a result the transmitter picked up the low frequency electromagnetic oscillations of the medications. A receiver which separated the carrier wave from the lower frequencies of the medication was positioned at some distance from the transmitter; these low frequencies were emitted to the measuring honeycomb of the bioresonance system. The informative electromagnetic frequencies were then transmitted on from the measuring honeycomb to the hand electrode of the bioresonance device (cf. Rothe, 2012). This test set-up produced the same effects as with medications and homoeopathic remedies, demonstrating that these emit electromagnetic frequencies which interact with the body's own frequencies and receptors.

An electronic filter can be incorporated into this "test transmitter receiver system" after the receiver and a connection established from this to the measuring honeycomb. This enables the wavebands to be determined within which the frequencies of homoeopathic remedies are located **(Table 2)** (cf. Rothe, 2012).

Table 2: Electromagnetic frequency ranges of homoeopathic D-potencies

Homoeopathic potency	Electromagnetic waveband (Hz)		
DO	1	–	100
D3	100	–	250
D6	250	–	000
D8 —D10	500	–	1 000
D12	1 000	–	2 500
D16	2 500	–	5 000
D30 — D60	5 000	–	10 000
D100	10 000	–	25 000
D200	25 000	–	50 000
D400	50 000	–	100 000

(Rasche, 1995, cf. Rothe, 2012).

The modified frequencies of the electromagnetic structural images of the parent substance (mother tincture) are located within these wavebands. The process of vigorously shaking might act as a filter whereby, at increasing potencies, this would allow ever higher frequencies through or would amplify these while the lower frequencies dwindle away.

The healing power of homoeopathic remedies consequently appears to reside in their effect on electromagnetic fields which are emitted by pathological structures in an organism. Proteins, in particular, are possible examples of such structures as they react to even the slightest electromagnetic fields. The electromagnetic oscillations emitted by homoeopathic remedies can also affect entire biochemical metabolic pathways by exciting them or eliminating pathological oscillations (Harisch and Kretschmer, 1990; cf. Rothe, 2012).

6. The energy of watery liquids

An energy value can be attached to water and watery liquids, including bodily fluids. This value is calculated as proposed by the French scientist Louis-Claude Vincent and is based on the three physicochemical parameters pH value, redox potential and electrical resistance.

6.1 The three basic parameters

The three parameters used to assess the properties of water are as follows:

1. The pH value represents the negative decadic logarithm of proton (H+) concentration; e.g. pH = 7 corresponds to an H± concentration of 10' mo1/1. A solution is described as acidic if its pH is less than 7, it is neutral at pH 7 and alkaline if the pH is greater than 7.
2. The rH value represents redox potential and is given in millivolts (mV). It provides information about water's or a watery liquid's ability to reduce (electron release) or oxidise (electron acceptance).
3. The rho value. This indicates the specific electrical resistance of a watery liquid and is given in kilo-ohms (k0). It is largely dependent on the number of dissolved salts.

The three values, pH, rH and rho value can be used to calculate the energy value of a watery liquid. According to Louis-Claude Vincent, the energy P (microwatt, pW) of a watery liquid is derived as follows:

$$P\ (pW) = 29.07\ (rH - 2pH)^2 / rho$$

where

rH = redox potential (mV)
pH = —log l-1+ concentration and
rho = electrical resistance (kid)

(cf. Rothe, 2012).

6.2 Bodily fluids

The pH value of various bodily fluids such as the blood, saliva and urine, for example, is kept within narrow bounds by appropriate buffer systems. These include the carbonic acid/bicarbonate buffer system, for example, as well as various proteins.

A well-know redox reaction in organisms which serves to maintain the redox potential of cells is the balanced reaction catalysed by the enzyme glutathione reductase:

2glutathione-SH + NADP± =
glutathione-S-S-glutathione + NADPH+1-1±.

The rho value provides information about an organism's mineral balance. It is regulated in the three bodily fluids by transport or transmission systems.

The physicochemical values pH, rH and rho normally fluctuate within narrow limits in bodily fluids since they are subject to the body's own regulatory system. Consequently deviations from the normal range can often be linked to certain diseases. The French scientist L.C. Vincent placed the individual values in relation to one another and described in mathematical terms the organism's exchange circuit via the blood, saliva and urine. This makes it possible to determine the *milieu* in the human organism and with this parameter to identify at an early stage those diseases affecting modern civilisation and the impact of therapy; a computer can be used to perform the calculation with the therapist analysing the results (cf. Morell, 1980). In addition, a computer program devised by L.C. Vincent enables a vitality factor to be calculated which measures the organism's powers of resistance, primarily with regard to cancer and a global factor which takes into consideration both immune defence and energetic state (cf. Morell, 1980).

6.3 Case study

Table 3 indicates the standard values in the bodily fluids blood, saliva and urine. It also gives values before and after combined bioresonance and acupuncture treatment by way of example.

Table 3: Standard values for water parameters in various bodily fluids and as an illustration of a disorder

Bodily fluid	Water parameter		
	pH	rH	rho
Blood	7.51 7.1	26.5 22	165 210
Saliva	7.42 6.5	25 22	186 *140*
Urine	5.14 6.8	23 24	85 30

Standard values: italics.

This was a case of a 56-year old female patient with a disorder of the duodenum. She was also suffering from biliary dyskinesia, chronic constipation, cerebral sclerosis with dizziness and insomnia (Morell, 1980).

Following bioresonance therapy with the hand electrode and targeted acupuncture treatment the mineral salt readings from the patient's blood and urine soon shifted towards the standard values. There was also a positive change in the pH values in the saliva and urine after a short time (Table 4) (Morell, 1980).

Table 4: Standard values for water parameters in various bodily fluids and after treating the case cited in Table 3

Bodily fluid	Water parameter		
	pH	rH	rho
Blood	7.55 *7.1*	25.8 22	188 210
Saliva	7.2 6.5	27.3 22	192 140
Urine	5.7 6.8	23.3 *24*	43 *30*

Standard values: italics (Morell, 1980).

Therapy consisted in inverting the patient's own oscillations 180° and returning them to her, together with electroacupuncture treatment. The pathological oscillations were consequently eliminated bringing the patient's readings into line with the standard values for water parameters in the blood, saliva and urine. Very little energy is required for this process. It is assumed that the oscillations used interacted with membrane proteins thereby altering their transport capacity. This then led to the observed changes in the milieu in the blood, saliva and urine. The effect of bioresonance therapy was definitely felt in the long term (Morell, 1980).

7. Membrane potentials

The regeneration of the three water parameters' (pH, redox potential and electrical resistance) pathological values to bring them in line with standard values by

treating them with the body's own inverted oscillations indicates that these electromagnetic oscillations reacted with the body's regulatory structures. The transport proteins in the cell membranes most likely play a primary role here. Their role is to convey ions and low-molecular molecules across the cell membrane. Regulatory processes ensure a particular milieu prevails both within and outside the cells. This also includes a particular charge distribution across the membrane which leads to a corresponding membrane potential. This in turn influences certain ion channels, e.g. the calcium channels. They are regulated by the voltage across the cell membrane. If their transport capacity changes, then the membrane potential of the cells also changes due to altered positive or negative ion charges between the interior and exterior of the cell. This results in changes in the milieu of the bodily fluids blood, saliva and urine.

Certain electromagnetic frequencies can inhibit the transport of calcium through calcium channels; these frequencies range from 560-880 MHz and from 920-1100 MHz **(Table 5).** The 7.801 Hz heart meridian frequency and chakra frequency as well as the associated 384 MHz frequency (Table 5) also block calcium channels. The 1.42 GHz frequency (H_2 resonance) and that of 2.45 GHz (which affects the conversion of L-amino acids into D-amino acids) inhibit calcium channels thereby disrupting the electric potential of cells. This potential is of crucial importance for differentiating cells (Pall, 2013). Some of the frequencies mentioned match those generated technically (Table 5).

The membrane potential of non-excitable cells is involved in numerous biological processes. It regulates the differentiation, growth, migration and orientation of a large number of cell types, including stem cells, neurons and neuronal precursor cells.

The space-time model of the membrane potentials of non-excitable cells is also instrumental in regulating embryonic development, regeneration processes and metastatic transformation of cells (Tseng and Levin, 2013).

Table 5: Technical and biologically relevant electromagnetic frequencies

Technical system'[1]	Frequency	Biological system	Frequency'[1]
TV transmitter UHF	470 — 838 MHz	Calcium channels	560 — 880 MHz
Mobile telephony D network (GS 900)	890 — 960 MHz	Calcium channels	920 — 1100 MHz
Base station Mobile phone	890 — 960 MHz		
WLAN and Bluetooth	2.4 — 2.48 GHz	Configuration changes	2.45 GHz[3]
Radar equipment Air traffic control, civilian and military	1 — 10 GHz	Molecular hydrogen	1.42 GHz[31]

1) http:www.bfs.de/de/e ektro/hff/grundlagen.html
2) Smith, 2013
3) These frequencies also inhibit the transport of Ca' ions through calcium channels in the cell membranes

8. Coherence

Coherence means order. Molecules positioned closer to one another than the wavelengths they emit radiate in a coordinated fashion, or coherently, as the molecules influence one another reciprocally (Dicke, 1954). These coherent states probably occur in elongated mitochondria, i.e. it is highly probable that laser radiation is generated here. As some of this escapes from the mitochondria it could reach the neighbouring microtubules and, from there, be carried throughout the entire interior of the cell and, from there, into neighbouring cells. Even without "outside" influence, electromagnetic waves of certain wavelengths are apparently generated in the microtubules themselves. Consequently an exchange of informative electromagnetic frequencies by this means appears highly likely. As the electromagnetic waves escaping from the mitochondria and microtubules would have to penetrate the water surrounding them and, in all likelihood, this water exhibits coherent domains, these waves would, at the appropriate wavelengths, be stored in these domains. As the domains are in a permanent state of formation and degradation, this would lead to the creation of non-local electromagnetic fields. This would explain how it is possible to influence processes within the human body through the action of external electromagnetic fields. It should also be borne in mind in this connection that there are numerous other molecular systems in organisms which generate electromagnetic radiation without this being laser radiation. At the right wavelength this can also be retained in the domains where it generates coherent radiation. The size of the domains varies considerably and so a large number of electromagnetic frequencies can be stored. One explanation for the action of phase-inverted treatment with bioresonance could therefore be its influence on the coherent radiation stored in the water domains. The fact that these domains are connected with one another might explain the immediate effect under the action of bioresonance. Conversely, a dissociation of coherent water domains should lead to the transfer of electromagnetic fields to biological units which may resonate with them. This would explain the time dependence of the action of bioresonance treatment.

In connection with the treatment within the bioresonance method by phase inversion using frequencies it should be remembered that biological systems are quantum systems which are governed by corresponding laws. In such systems a situation similar to a lottery may arise where the winner takes all and the rest are left empty-handed. In other words, a dominant frequency persists and the remainder are eliminated. It is not a case here of a disruptive interference as such. A quantum system involves the variables mass, energy and momentum; frequencies can also be cancelled out here. A condition such as this occurs in the course of Bose-Einstein condensation (C. W. Smith, pers. communication). It could arise in disorders and therapies where certain frequencies survive.

9. Summary

Electromagnetic frequencies which are preserved in water for a prolonged period are described as water's "memory". This particular information can be transferred to non-informed water by various methods. Electromagnetic frequencies in water can be biologically relevant.

Water's microstructures are critical for its capacity to store electromagnetic frequencies. It is generally assumed that water develops at least two microstructures in its liquid state, lower density associations as well as higher density associations of water molecules. This is confirmed by experimental findings on the solubility of ions and by X-ray analyses. Photons of suitable energy can excite large numbers of water molecules to oscillate in a similar manner so that coherent domains develop. These have a minimum diameter of approx. 75 nm and are able to absorb electromagnetic frequencies. Several domains of increasing size can enclose one another. A cubic centimetre of water is

capable of storing up to 1000 different electromagnetic frequencies.

Molecules (medicinal products) give off electromagnetic frequency images which most probably originate from their spin structures. These are passed over to water and can be transferred from water which has been informed in this way to non-informed water. Both simple processes and technical processes have been developed in this connection. The latter includes the production of homoeopathic potencies. These display increasingly high frequency electromagnetic frequencies depending on the potentisation stage. This fact, together with the electronic medication test procedure which can be carried out with the bioresonance method, demonstrate that organisms have an electromagnetic level of regulation. Experiments with tadpoles confirm this principle and indicate the necessary boundary conditions. It was recently reported that water can be energised with radio waves and agricultural plants watered with this water produce higher yields, are more resistant to disease and need less water to grow.

The physicochemical properties of water can be recorded through the three parameters pH value, redox potential and electrical resistance. All three can be combined to produce an energy value. The three physicochemical parameters can also be measured in bodily fluids such as blood, saliva and urine. Here they provide information about a person's acid-alkaline and mineral balance. The three variables are usually maintained within narrow bounds. The individual values can be placed in relation to one another and used to calculate the milieu within a person's body. Based on this parameter the early detection of diseases affecting modern civilisation may be possible . The French scientist L.C. Vincent also generated a vitality factor which can be used to measure an organism's powers of resistance, predominantly in connection with cancer. Deviations from the standard values for the three physicochemical parameters can be treated with bioresonance. This shows that the body's own oscillations are involved in regulatory phenomena. Membrane potentials probably play a decisive part in this as they regulate the activity of calcium channels in particular and endogenous calcium concentration influences gene transcription and thus the development of cells. The membrane potential of non-excitable cells regulates, in a decisive manner, the differentiation, growth, migration and orientation of a large number of cell types, including stem cells, neurons and neuronal precursor cells. The space-time model of the membrane potentials of cells is also instrumental in regulating embryonic development, regeneration and metastatic transformation of cells.

Coherence represents a central process with regard to the effect of electromagnetic frequencies in organisms. Electromagnetic frequencies in coherent systems travel both at the speed of light (v = 3 x 108 m/sec) and at the speed at which coherence travels (m/sec). Frequency thus becomes a multiple variable. This means that the frequencies of chemical substances (UV, visible light, IR) are linked with microwaves and lower frequency biological frequencies and the individual levels are therefore coupled.

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