

Stimulating self-repair through the Schumann resonance

Evidence exists that Schumann resonance, an electromagnetic vibration in the atmosphere, plays a role in healing and health. Below is the evidence and explanations.

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Introduction

In this author's article in TIG 19-3, we have already briefly discussed the sensitivity of the pineal gland in the human brain to electromagnetic fields in the ELF range (extremely low frequency, 1-100 Hz). In this article it will become clear how intensely we and our health are connected to the natural electromagnetic vibrations in our environment. This goes even further than the pineal gland. And this is just one of the types of natural electromagnetic waves in the atmosphere, in which our brain waves vibrate. Below you can read how our brains (can) tune in to this so-called Schumann resonance and how this can promote health and healing.

Electromagnetic vibrations of the Earth

In the Earth's atmosphere a series (a "chord") of electromagnetic vibrations naturally exists, which together are called the Schumann resonance. These were theoretically calculated in 1952 by the German physicist Winfried Otto Schumann, professor at the Technical University of Munich (Schumann, 1952). These vibrations have the frequencies 7.8; 14.1; 20; 26; 33; 39; 45 and 51 Hz (Hertz, or the number of vibrations per second, see Figure 1). Theoretically, he calculated approximately these frequencies in 1952, based on the idea that the space between the electrically negatively charged earth's surface and bottom of the positively charged ionosphere, 55 kilometers above it, is a vibrating cavity, like an organ pipe. Schumann, and most geophysicists after him, assumed that this vibrating cavity, like a blown-in organ pipe, will vibrate in its own frequencies as a consequence of the total of thunderstorm discharges in the entire world (several thousand per second). These, according to that theory, constitute the electromagnetic "air" with which the "organ pipe" between earth's surface and ionosphere is blown on. The electromagnetic frequencies are determined by the size of the vibrating cavity, just as the pitch is determined by the size of the organ pipe.

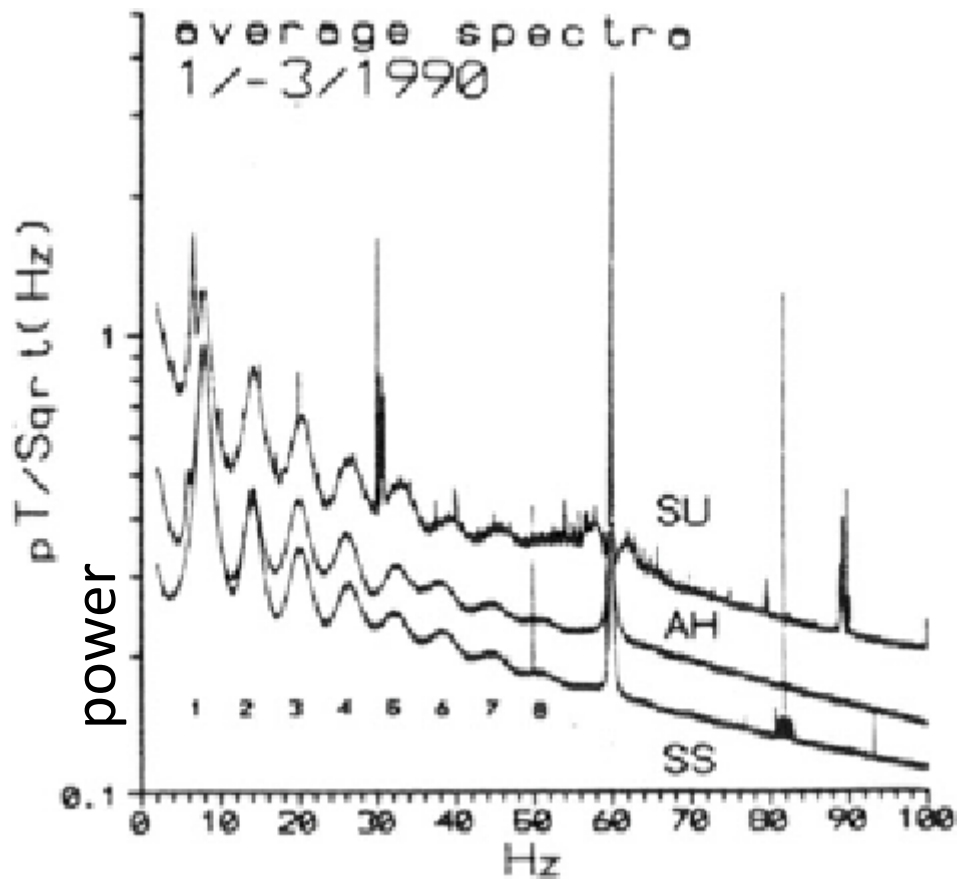


Figure 1: Spectra of the Schumann resonance measured at various locations. SU = Stanford, California, AH = Arrival Heights, Antarctica, SS = Sondrestromfjord, Greenland. Source: website of the University of Frankfurt.

However, in the atmosphere these vibrations are not sounds but electromagnetic waves: extremely low-frequency (ELF) radio waves in this case. The lowest frequency (7.8 Hz) of this series of radio waves has a wavelength of 40,000 km, or the circumference of the Earth. The higher frequency waves have shorter wavelengths. In 1954, Schumann and his student and successor Herbert L. König first measured the Schumann resonance (Schumann and König, 1954). König and many after him noted that the received wave pattern is strikingly similar to the recording of the brain wave pattern or EEG (electroencephalogram) of a person relaxing (König 1974). They then called the Schumann resonance "the brain waves of Mother Earth" (see Figures 2 and 3).

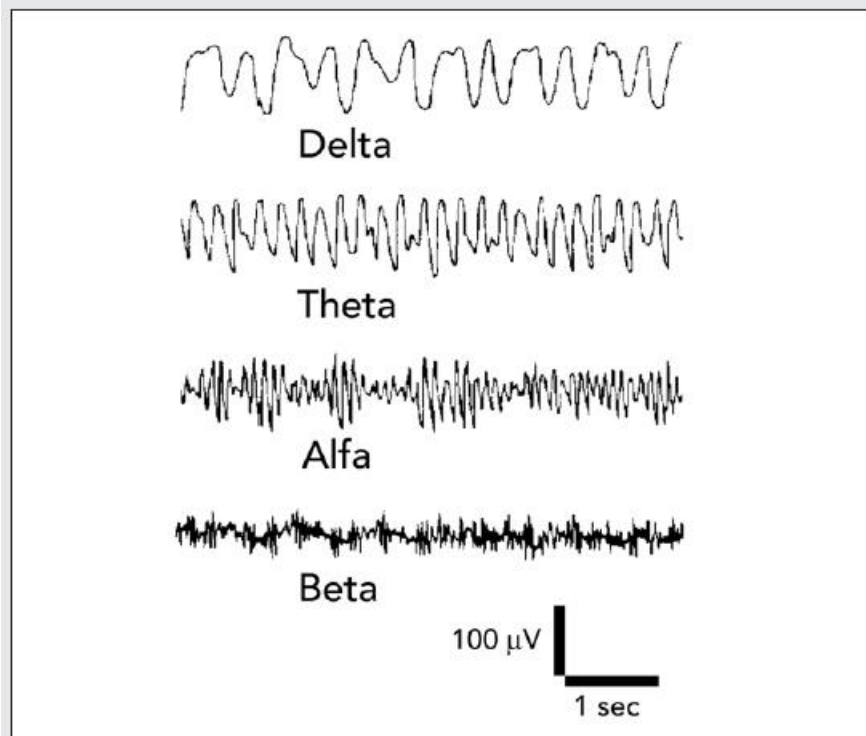
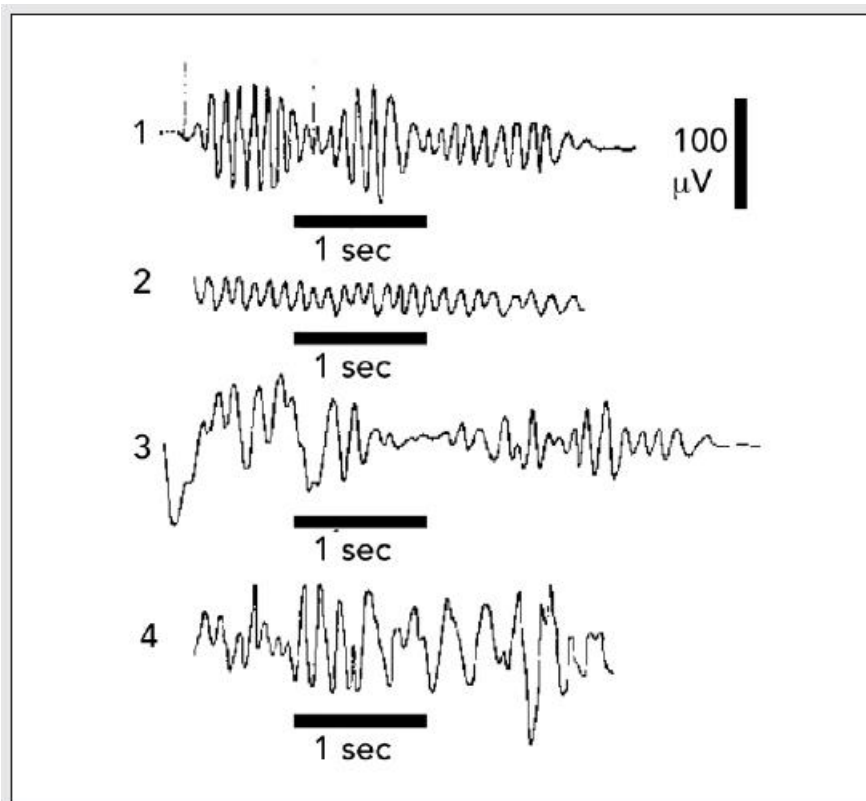


Figure 2: Above: Atmospheric ELF registrations by W.O. Schumann and H. König (1954). Below: the main waves in the adult EEG.

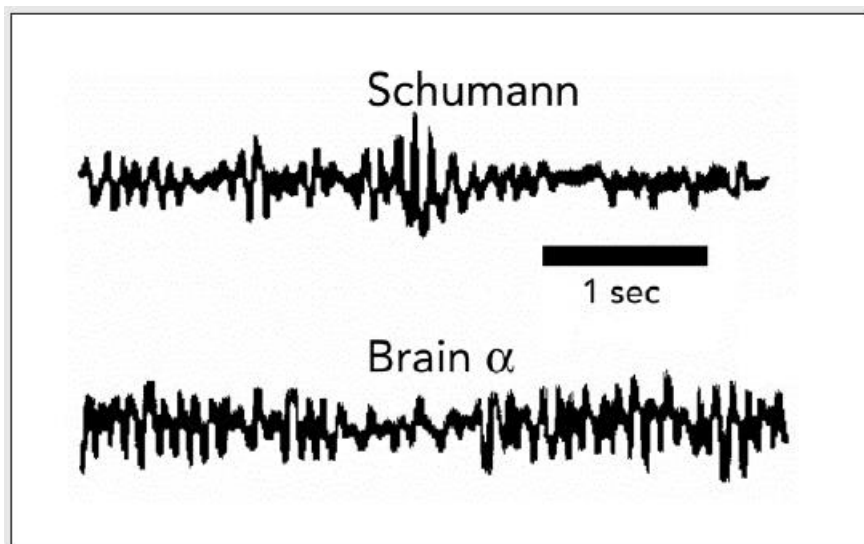


Figure 3: A Schumann resonance signal and an alpha brain wave. This illustration is modified to Figure 15 in König (1974). Source: James L. Oschman (1997).

Before proceeding further, it might be good to get something correct about a view that is widely discussed in spiritual literature. In spiritual circles it has been claimed in recent years and frequently posted on the Internet, that the basic frequency (7.8 Hz) of the Schumann resonance is increasing to 14 or 15 Hz, raising our level of consciousness and our brain wave frequency increasing from the alpha range (8-12 Hz) to the beta range (12 Hz and higher). The beta range belongs to the waking state, and so this is interpreted as humanity going to wake up. Gregg Braden, originally a geophysicist, claims to have heard this from scientists in Norway and Russia; references are not given (Braden, 1994). It is not known what kind of vibration they have measured in the atmosphere and seen increasing in frequency, but it is at least not the Schumann resonance. On the Internet you can find measurements from many universities around the world, which show that the base frequency is still 7.8 Hz and fluctuates at most by 0.5 Hz (see Schumann resonance online, bibliography). Thus, the base frequency constantly varies from 7.3 to 8.3 Hz, due to influences from space, such as solar eruptions, and as a result of the rotation of the Earth. Nowhere are measurements to be found that show that the base frequency of the Schumann resonance is increasing. If this were true, it would mean that the longest wavelength in the series must be getting shorter, or the Earth must be shrinking significantly, which is not the case. For the planet Mars, for example, which has a diameter twice as small as Earth, it has been calculated that the Schumann resonance base frequency is 14 Hz. Moreover, it would not be healthy if we could no longer have our brain waves slow down to below the beta range. Then we would no longer be able to relax and sleep. The consequence would be, that after a few days we would become psychologically disturbed.

Brainwaves

Our brain waves are electrical voltage vibrations with an intensity of 2 to 200 microvolts (μV), which come from electrical brain activity. We can pick them up on the scalp via attached electrodes (metal plates) and record them as EEG (electroencephalogram). Each electrode picks up the electrical vibrations from thousands of neurons (brain cells) from the outer few millimeters of the cerebral

cortex, which is actually only 4 mm thick. The human EEG was first recorded in 1929 by German psychiatrist Hans Berger.

The EEG of the adult human has roughly four frequency bands, associated with various states of consciousness:

- High Beta or Gamma (30-60 Hz): Hyper-alert state. 40 Hz is important for integration of all brain functions and possibly for intellect and meaning.
- Middle Beta (15-30 Hz): Normal waking, alert state. Sensory perception. Logical thinking. Decision-making. Active visualization (or intentional representations).
- Low Beta (SMR or Sensory-Motor Rhythm, 12-15 Hz): State of alert relaxation (compare: a cat waiting for a mouse). Important for motor skills and body sensation. Important for mutual organization of all brain functions. Important for alertness and responsiveness.
- Alpha (7-12 Hz): Relaxation. Beneficial for learning. Receptivity, information storage. Non-thinking, non-visualizing.
- Theta (4-7 Hz): Deep meditative state and light sleep. Spontaneous inner images, dreams. States of (dis)pleasure and drowsiness.
- Delta (0.5-4.0 Hz): Deep sleep stages.

(From the Brainwave Frequency Listing on the Internet.)

Although as a boundary between alpha and beta 8 Hz is chosen by some researchers, this boundary is not so sharp and is in fact 7.0-8.0 Hz. This region is called "slow alpha. But it is precisely this boundary region that is so interesting, as you will read.

Brain waves, healing and the Schumann resonance

Since the early 1970s, EEGs have been studied of meditation practitioners, remote viewers (clairvoyants) and energy therapists, to see whether their brain waves are related to their particular state of consciousness. A common phenomenon discovered was that these people, while engaged in their activity, produced brain waves at the boundary between the alpha and theta range, 7.0-8.0 Hz, also called 'slow alpha waves' ('low alpha', Oschman, 1997, 2000; Sidorov, 2002). It was found that their brain waves, in their altered state of consciousness, regularly became in step, that is, equal in phase and frequency to the base frequency (7.8 Hz) of the Schumann resonance, despite the fact that it constantly fluctuates by up to 0.5 Hz. The frequency was simply followed by the brain waves (Cherry, 2001; Oschman, 1997, 2000; Sidorov, 2002).

From this they concluded that our brains undergo "entrainment by the Schumann resonance (literally: 'being taken along in the train of'); they get in step with it. The fact that this happens off and on is explained by the so-called 'free running periods' or 'silent phases' of our brain. From within, the alpha rhythm of the brain is driven for periods of 1.5 to 28 seconds by electrical signals of 6 to 10 Hz that come from groups (nuclei) of brain cells in the thalamus (an area located in the brain stem, deep inside our brain), whose axons (offshoots) reach into the cerebral cortex, the outer layer of our brain. Between these periods are pauses of 2 to 20 seconds, which are called the "free running periods" or "silent phases (Ball et al, 2000; Luthi et al, 1998; Oschman, 1997, 2000). During these free running periods, when the brain is momentarily not under the influence of the thalamic nuclei, it may start vibrating along with the Schumann resonance. The thalamus nuclei produce electrical wave trains of 6-10 Hz for periods of 1 to 3 seconds, which can continue for up to 28 seconds (Ball et al, 2000; Luthi

et al, 1998). During inner relaxation sessions to promote one's self-repair, an entrainment of brain waves (EEG) by the heart-rhythm (ECG or electrocardiogram) is observed. In fact, then the sixty times stronger electric field (in the head) of the heart takes that of the brain into its rhythm (McCraty 1995-2002).

'Entrainment' can be compared to what happens when two pendulum clocks hang on one wall. They are thus connected to each other by this wall. When they are newly hung, they tick in a different rhythm, but over time they tick in the same rhythm, because the most powerful clock imposes its rhythm on the weaker one, transferring its energy through the wall. In a living organism, the electromagnetic sources of vibration, such as heart and brain, are linked together, making entrainment possible. This is a form of resonance, which together saves the vibration sources energy (Institute of HeartMath, 2003).

Measurements have also been made of the electromagnetic fields emitted by the body, such as on the hands of energy therapists while giving a healing, for example by hand-laying or "irradiating" a few centimeters or decimeters away from the client. Also here the same low-frequency waves and wave patterns were recorded as in their EEG and in the Schumann resonance (Seto et al, 1992; Oschman 1997, 2000).

To summarize: in all of the above discoveries, it seems that something in the hands of the therapist is activated when (s)he relaxes and through this relaxation enables his/her EEG to adopt the rhythm of the basic frequency (7.8 ± 0.5 Hz) of the Schumann resonance. This appears to be accompanied with an increased capacity for self-repair in the person currently being healed and also in the therapist him/herself. So far, the author has been unable to find any literature showing that these relationships were not there.

The word "self-repair" refers to the following process: as long as it is alive, an organism will strive to maintain its internal balance in terms of metabolism, tissue intactness, etc.. Once this balance is disturbed, the organism will try to restore it. This is called "homeostasis". The organism becomes sick when damage is done faster than it can repair. If the damage stops in time, the organism can still recover. If the balance of the organism gets disturbed beyond a certain point, a disease arises, which in the most serious cases has a fatal end. If the self-repair capacity of an organism is stimulated, it can lead to a faster and more effective restoration of its internal balance.

Possible mechanisms

Compared to our brain waves, the Schumann resonance is an extremely weak signal, which seemingly contradicts to the principle of entrainment. About the intensity of the Schumann resonance signal there are divergent reports: electrically seen 1-10 mV/m and magnetically seen 1 pT - 10 nT (Adey, 2004; Cherry, 2001; Schlegel & Füllekrug, 1999). Human brain waves are in the order of 100 nT at the scalp, which is 10-1000 times stronger. Nevertheless, it is suspected that our brains have an extremely sensitive "detector" which amplifies the Schumann resonance into a powerful vibration. Thus, our brain cells would be electromagnetically vibrating with its base frequency, which then becomes visible in our EEG (Cherry, 2001).

Although much experimental testing is still needed, several plausible candidates have already been put forward, which could be the 'detectors' and 'amplifiers' for the Schumann resonance in our brain. These are the cell membranes, the proteins and the DNA strands that behave like liquid crystals and the cell water, which also behaves like liquid crystal in the vicinity of membranes and which are able

to amplify ELF waves. Waves like those of the Schumann resonance are coherent, at least for every few seconds (the wave trains). Because of this the Schumann resonance frequencies or the higher harmonics of these can be basically picked up and retransmitted by the biomolecules. It has even been suggested that the different electromagnetic waves with frequencies higher than that of the Schumann resonance, passing through biological systems, together form an interference pattern. The energy distribution of these interference patterns would form a template for the construction of biological forms, from the level from a cell to a multicellular organism (Beal, 1996).

It can be predicted by theoretical models that in specific ranges of magnetic ELF frequencies and strengths, namely those of the Schumann frequencies, biological effects are to be expected. These ranges correspond to the rotational frequencies of ions (even without Schumann resonance) trapped by proteins and of ions, which are dissolved in the cell water. (Adey, 2004; Aspden, 1997; Binhi, 2002; Liboff, 1992; Pazur, 2003).

Furthermore, the crystals of magnetite, even smaller than the wavelength of visible light, which are in our brain cells all over the brain are considered. These magnetite crystals (Fe_3O_4) have a diameter of only 50 nm (nanometer or 50 millionth of a millimetre) and occur in relatively high concentrations in the ethmoid bone (inner eye socket) and sphenoid bone in the base of our skull and in lower concentrations in many areas of our brain, also in our pineal gland (Kobayashi and Kirschvink, 1995). These magnetite nanocrystals are slightly magnetic and form a strand surrounded by a membrane, in the cytoplasm. Joining their north and south poles, these magnetite nanocrystals together form a larger magnet, which reacts even more easily to fluctuations in the earth's magnetic field strength, that are the Schumann vibrations (Kobayashi and Kirschvink, 1995).

Their idea is that these magnetite 'chains' rattle along with the base frequency of the Schumann resonance. Because they are connected by 'springs' (helical proteins, so-called 'gating springs') of the cytoskeleton to gates made of protein in the cell membrane, these alternatingly open and close, so that 'shots' of positive ions (charged particles) are allowed in, which lead to electrical cell depolarizations and electrical pulses respectively that spread from neuron to neuron, eventually leading to the Schumann resonance-like brain wave pattern, which we then see in the EEG. This influences the skeleton of protein fibers that branches through the entire cell including the cell nucleus, activating genes in the DNA which lead to a reaction of the cell metabolism (Conova, 1999; Galliani et al, 1989; Redecke, 1999; Roney-Dougal, 1993). For example, this could be the melatonin production by the pineal gland. The pineal hormone melatonin relaxes us and causes us to fall asleep. Asleep or in deep meditation melatonin can also be converted into, among other hormones, pinoline and DMT (dimethyltryptamine), which enable us to dream and to see inner images. Could the same happen when remote viewers tune in? All pineal hormones affect cells in many areas of our brain. In the previous issue of TIG this author's article about these hormones and their interaction with consciousness has been published.

James Oschman has developed an explanatory model of the reception and further conduction of the basic rhythm of the Schumann resonance by the human body (Oschman, 1997, 2000). In his model, the Schumann resonance is received by tissues containing magnetite, in the pineal gland, elsewhere in the brain, in the sphenoid bone and in the ethmoid bone. The cells of these tissues enable the brain during the aforementioned 'quiet periods' to synchronize with the base rhythm of the Schumann resonance.

This vibration is then passed through the rest of the body through the connective tissue that lines the nerves (perineural system). The consequence is that this is measurable around the body as an alternating magnetic field in the ELF range (1-100 Hz), for example, on the palms (Seto et al, 1992). As

a therapist, in this state of entrainment lays on or aims his/her hands toward a client, (s)he is entrained by the therapist, and over time also by the base frequency of the Schumann resonance itself, stimulating self-repair.

It was mentioned earlier in this article that remote viewers in function show synchronization of their brain waves with the Schumann resonance. Scientists who study phenomena such as remote viewing (RV) and are convinced of its existence, have long wondered what transfers the information that RVers receive, i.e., what it is that RVers read out. The physicist Lian Sidorov in the United States suspects it is the vibrating electromagnetic field formed by the Schumann resonance that is the information conveying medium (Sidorov, 2002). As an RVer wants to investigate a location that (s)he has never visited (and of which only the coordinates are mentioned), (s)he uses his/her intention to tune into that location and to exclude (as much as possible) the impressions of all other places. As a result, the RV-er picks up that particular information from the Schumann resonance field about the targeted location, after which (s)he can describe and draw the features of that place.

A biofeedback system for promotion of healing

My hypothesis, which stems from all of the above studies cited, is that humans can stimulate their self-repair ability through learning to synchronize their brain waves with the base frequency of the Schumann resonance (7.8 ± 0.5 Hz) of the Earth. Self-repair is the ability of the living organism to restore and preserve its internal balance terms of metabolism, tissue integrity, etc.

Therefore, the author is forming ideas for the development of a biofeedback system, which informs the user about his/her brain waves, together with the Schumann resonance measured at the same time. A software program should inform the user whether his/her brainwaves are synchronized with the Schumann resonance or not. This feedback can best be given in the form of sound, so that one work with the eyes closed. As the user learns to synchronize his/her brain waves with the base frequency of the Schumann resonance through this form of biofeedback, (s)he can then make the session a little more challenging for themselves, so that even more 'entrainment' of the brain waves with the Schumann resonance occurs and thus an even stronger stimulation of the self-repair capacity.

What the user actually does is synchronize his/her brain waves with the Schumann resonance, that is, the brainwaves follow it in phase and frequency. The great thing is that this biofeedback equipment will make itself unnecessary over time due to the learning process. The user will increasingly spontaneously synchronize his/her brain waves with the base frequency of the Schumann resonance. About neurofeedback (training of certain brain wave frequencies) it is known, that the beneficial effects are permanent.

With biofeedback based on the Schumann resonance perhaps healing and quality of life may be promoted over a very wide area of medicine, for a very broad spectrum of injuries and illnesses. It is even possible that without technical biofeedback, we normally maintain our health by subconsciously tuning in our brain to the basic vibration of the Schumann resonance by going into deep relaxation regularly, each time reminding our brain of this vibration that has been present on Earth for billions of years. In the present time in which the atmosphere is filled with many man-made electromagnetic frequencies in the same range as the brain waves, biofeedback by means of brain waves/Schumann resonance can give a helping hand.

Promoting self-repair or remote viewing has been attempted in the past through a form of biofeedback for training the brain waves to synchronize with an artificial, fixed frequency of 7.8 or even 7.83 Hz (Houck, 1994). This can also be achieved by exposing oneself to sound pulses and light flashes of this frequency via a so-called brain machine. The question is whether this works beneficially, because these vibrations, and with it our brain waves, can occur in a completely opposite rhythm (or: in opposite phase) with respect to the base frequency of the natural Schumann resonance, which in addition constantly fluctuates in frequency as a result of influences from space and as a result of the rotation of the Earth. Do you tune into the natural Schumann resonance, then one tunes automatically into the even lower frequency electromagnetic waves from the cosmos, the micropulsations of 2 milliHz-5 Hz, which contribute to the fluctuation of the Schumann resonance frequencies. Interesting is that the sympathetic-parasympathetic rhythm (0.1 Hz) falls within this frequency band.

In addition to the self-repair frequency of 8 Hz (deep, meditative relaxation) also other frequencies of the Schumann resonance can be useful to synchronize our brain waves to through biofeedback. This probably also happens spontaneously. The second mode of the Schumann resonance is 14.1 +/- 0.5 Hz. This frequency falls within the band of the slow beta waves: 12-15 Hz. This frequency band, like the (slow) alpha waves, occurs as trains (English: 'spindles') in the EEG and is called "sensory motor rhythm" (SMR). Neurofeedback training of this rhythm promotes good cooperation between senses and motor skills and structures all brain functions.

SMR appears in the EEG in a state of alert relaxation. It was originally discovered in cats, which produce this rhythm when for example they are waiting for a mouse at a hole.

Neurofeedback therapy is usually started by training this rhythm, with the electrodes above the central strip of the cerebral cortex. After this, if necessary, the neurofeedback training can be focused on other frequencies and brain areas. It would be interesting to study whether this training becomes even more effective when one learns to synchronize the brain waves to the second mode of the Schumann resonance.

The next two modes of the Schumann resonance fall in the mid-beta brainwave range (20 and 26 Hz), which correlates with an awake, active state of consciousness. The highest four frequencies of the Schumann resonance (33, 39, 45 and 50 Hz) are in the high beta brain wave range. The 39 Hz of the Schumann resonance is close to 40 Hz, a frequency in the adult EEG related to 'bonding', it bringing information from the different senses together into one observation. According to some researchers this frequency is also associated with insights and meaning (Zohar and Marshall, 2000).

Conclusion

It seems that the human body can tune in to the electromagnetic waves of the Schumann resonance in the atmosphere. According to the models found in the literature these vibrations are received and amplified by various nano-structures in and around the brain. This makes synchronization of the brain waves with the Schumann resonance possible in the periods that these are not driven by the thalamic nuclei.

By conducting these waveforms through the whole body through the perineural system, they become available to the whole body and they stimulate self-repair. If the suspected correlation between the Schumann resonance and self-repair is correct, it should in principle be possible to stimulate self-repair through biofeedback training of brainwave synchronization with the Schumann resonance.

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Summary

Self-repair stimulated by the Schumann resonance

Indications exist that the Schumann resonance (SR) in the Earth's atmosphere plays a role in self-repair. Measurements of the SR, human EEG and the body emissions of ELF magnetic fields have led to models describing the synchronization of brainwaves to the SR and further conduction of these waveforms through the body, stimulating self-repair processes. A biofeedback system is proposed for

training brainwave synchronization to the SR, enhancing self-repair, as a supportive means in a wide range of medicine.

Key words

Schumann resonance, EEG, synchronization, self-repair, biofeedback

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