THE ELECTROMAGNETIC ASPECTS OF BIOLOGICAL CYCLES

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ABSTRACT

The literature concerning electromagnetic influences on biological cycles is surveyed. This investigation is a continuation of attempts to understand the role of frequencies in living systems. Experimental work on determining the frequencies of a single cell of Acetabularia, T-4 lymphocytes in culture and the human subject shows that there are both stimulating and depressive frequencies which occur alternately as frequency is increased. These both exhibit a cyclic variation in frequency increases the rate at which the frequency jumping occurs. Exposure to weak fields of a depressive frequency completely halts the jumping at this frequency. The clinically therapeutic frequencies are the stimulation ones, the depressive frequencies create stress by suppressing frequency fluctuation which in hypersensitive persons lead to the observed patient specific reactions. *bioelectromagnetics, electromagnetic hypersensitivity, electromagnetic environment, electromagnetic bio-communication*

INTRODUCTION

The visible cyclic events of mitosis have been observed by optical microscope for more than a century. The cell division cycle of the typical adult human cell takes 18-24 hours, the higher plants have a 10-30 hour cycle, embryonic cells and bacteria may have cycles between 25-70 minutes. There are techniques for synchronizing cell division, but the triggering events that initiate DNA synthesis are not known. It is possible that they are electrical.

Alternating magnetic fields can affect the *lac operon* system of E. coli[1] and this involves the DNA through the synthesis of beta-galactosidase. The core of DNA is high in protons, so we reasoned that any disturbance such as the deposition of energy selectively into protons might lead to a measurable reproduction rate change. The results were unexpected and spectacular. Satisfying the proton nuclear magnetic resonance conditions during the growth of bacterial cells resulted in the same total cell mass, but almost twice as many cells of half the size.[2]

A wide range of biological cells show oscillatory phenomena.[3] Oscillatory chemical reactions may occur if the reaction rate is limited by concentration and diffusion of a reaction product. These could be affected by external magnetic fields if a singlet-to-triplet transition is involved[4] or by electromagnetic radiation through cooperative interactions with strongly excited polar molecular states.[5] Any sort of oscillator must involve the process of positive feedback, i.e. a stimulatory signal from the output reaching the input.

In the absence of external stimulation, the positive feedback will amplify and oscillate freely from the noise inherent in any system.[6] Weak external signals can force such an oscillator into synchronism, whereas stronger signals will saturate the system so it reverts to free-running from the noise.

Ross Adey has given the evidence for the responses of a wide range of bimolecular systems to certain weak environmental electromagnetic fields either in the low frequency region or radio frequency fields modulated by low frequencies.[7] Breithaupt[8] has considered the bio-information transfer properties of biological rhythms and their function in temporal morphology.

Wever[9] carried out a 25-year program of research into human circadian rhythms involving persons living for prolonged periods in underground dwellings shielded from the environmental fields, the controls lived in conditions similar but not shielded. Unexpectedly, the deep body temperature and the sleep-wake cycles had a remarkable sensitivity to weak electromagnetic fields. What started off as a tool became of great interest itself, able to entrain free-running body rhythms and even force a 23-hour daily cycle. The effects of the solar and lunar tides and environmental low-frequency fields on circadian rhythms have been summarized by Smith and environmental low-frequency fields on circadian rhythms have been summarized by Smith and Best.[10] For example, plants respond electrically to the variations in the geomagnetic field preceding dawn at ground level, or to an artificial field having the same rate of change. Dubrov[11] has covered a very wide range of effects of the geomagnetic fields on biological rhythms and circadian rhythms.

Fifteen years ago, Semm, Schneide and Vollrath[12] broadened their investigations of the pineal involvement in circadian rhythms and its reactions to light and darkness to consider the effects of magnetic field changes comparable to the strength of the geomagnetic field (0.5 gauss, 50 microtesla). Reiter[13] has written extensively on the pineal, and on melatonin as the chemical expression of darkness. The North American 60 Hz power supply fields have also been found to affect the melatonin rhythm.[14] The author has detected resonances at both 50 Hz and 60 Hz in a sample of pineal extract, which in turn suggests that the worst possible frequencies have been chosen for the World's power supply systems since, melatonin is also an anti-cancer agent.

EXPERIMENTAL

Work with electromagnetically hypersensitive patients[15] has led to the investigation of endogenous body frequencies and the development of therapies involving the stimulation of patient specific frequencies and measurement techniques derived from radiesthesia. It was known to the ancient Chinese that the acupuncture meridians in the human body have periods of activity (Yin), and passivity (Yang) over the 24-hour period. The question is whether the frequencies of living systems in general have any cyclical pattern of frequencies and whether this can be altered by external electromagnetic fields at levels typical of the environment.

The frequencies of live cultures of T-lymphocytes (supplied by Dr. B. Griffiths, E.H.C. Dallas) were found to be stable for short periods but then underwent sudden changes by about 10%. These cells were not synchronized and it was not practicable to work with a single lymphocyte. A crude index of electrical activity is a count of the number of frequencies detected. The peaks of the cones in Figure 1 show a rise of electrical activity over two days in Series 1 and a decrease over one day in Series 2.

Work with a single cell became possible during a visit to the laboratory of Dr. F.A. Popp, (Technology Centre, Kaiserslautem, Germany) where measurements were made on a single (10 cm long) filamentary cell of Acetabularia. There was a periodicity in the frequency jumping of about 25 minutes when the oscillator was only switched on while measurements were actually being made (Figure 2). When the oscillator was left on continuously at a 'stimulatory frequency', the frequency jumping speeded up tenfold to a 1.5-2 minute cycle as seen in Figure 3 (Series 2), while, if the oscillator was left on a 'depressive frequency' between measurements no frequency jumping took place at all (Figure 3, Series 1).

This frequency jumping phenomenon applies equally to the human body. Figure 4 shows the frequencies imprinted into a set of tubes of water over

a 2-hour period in the absence of any applied electromagnetic stimulation. The odd-numbered Series are the stimulating frequencies; the even-numbered Series are the depressing frequencies. The 9.5 Hz (stimulating) resonance was the only one that did not change during that period.

The effect of electromagnetic stimulation on the stimulating and depressing frequencies is shown in Figure 5 for the two highest frequency bands of Figure 4. The depressing frequency (Series 1) stops all frequency jumping, while tracking the stimulating frequency speeds the jumps to a six minute cycle around the frequencies (Series 2). This is similar to the behaviour of Acetabularia shown in Figure 3.

The empirical rule evolved for the therapy of electromagnetic hypersensitivity is to use an oscillator set to the highest stimulatory frequency, or some, or all of the stimulating frequencies imprinted into the water. Thus, it seems that this therapy involves stimulating lethargic autonomic systems in the patient. The persistent presence of a depressing frequency in the environment can paralyse the natural frequency jumping of a living system; moreover, it is a most unpleasant experience, which soon leads to a strong urge to get away from it.

A few simple tests in the presence of a depressing frequency came up with the following observation:

a) The effect of a depressing frequency (e.g. 1.75 MHz) is removed by an environmental alternating magnetic field at one of the stimulation frequencies (e.g. 3.1 MHz) or by holding a tube of water imprinted with a stimulating frequency. Drinking 10 ml of this imprinted water removed the effect of a depressing frequency at 1.75 MHz. It moved to 1.40 MHz for 12 hours; by 24 hours it had returned to its former 1.75 MHz.

b) A piece of ferrite-loaded microwave absorbing plastic placed over the umbilicus or crown of the head (chakkras) removed the effect of depressing frequency.

c) A glass tube of water held and succussed against a wood surface by a person in the presence of a depressing frequency can be regarded as an allergen and a remedy can be potentized from it without the need for electrical measurements, e.g. with electroacupuncture apparatus, or a serial dilution and succussion.

d) The results of holding various substances in the presence of a depressing frequency was investigated. The only ones showing any effect were: "Chronoset" (brain f.d. 50 mg., pineal gland 100 mcg., melatonin 1.3 mg. per capsule. Allergy Research Group, San Leandro CA) a homeopathic potency of Chamomilla, a camomile herbal "tea-bag".

e) In all these cases, the depressing effect had been moved to a different frequency, and a stimulating effect appeared at the former frequency.

CONCLUSION

The above experiments show that the living systems, single cells or human, have frequencies associated with their activities, and that depressing and stimulating frequencies alternate. An environmental frequency tracking a stimulating frequency speeds up the cyclic jumping rate about tenfold; while a depressing frequency completely stops this frequency's normal jumping activity. The stimulating frequencies are the same as those which are clinically therapeutic for the electromagnetically hypersensitive patient. The depressing frequencies are the same as those which provoke reactions. There are several ways to move a patient's depressing frequency away from an unavoidable environmental frequency.

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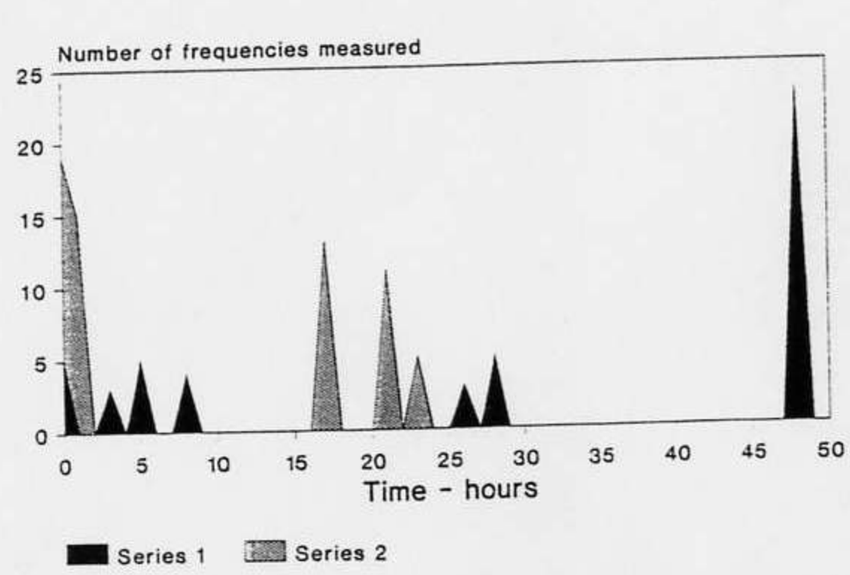

Figure 1

The variation in the count of the number of frequencies between 0.1 Hz and 5 MHz present in samples of T-4 lymphocytes representing an index of the electrical activity over a period of two days. Series 1 shows a growth in the electrical activity, while Series 2 shows a decrease. The samples were supplied by Dr. B. Griffiths of the Environmental Health Center, Dallas, where these measurements were carried out by the author.

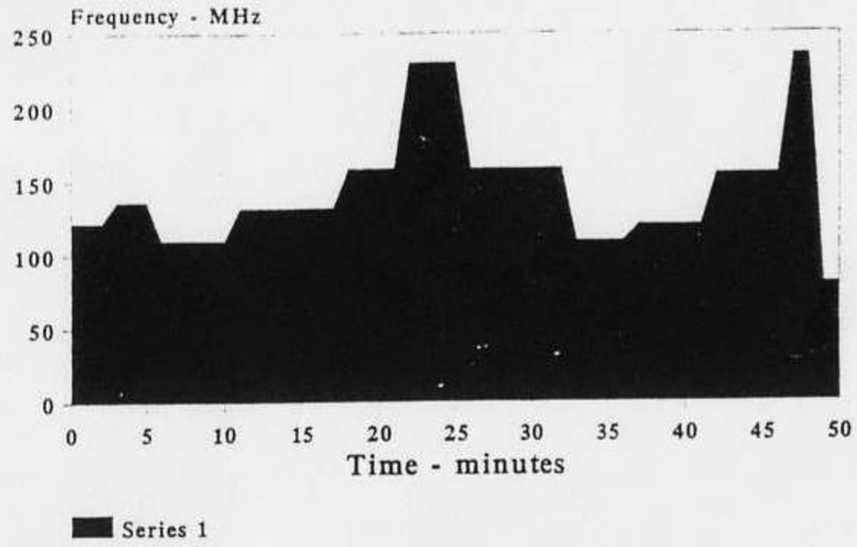

Figure 2

The variation in a single frequency over a period of 50 minutes for a single cell of Acetabularia showing a periodicity of about 25 minutes. The sample was supplied by Dr. F.A. Popp, Technology Centre, Kaiserslautern, Germany, where these measurements were carried out by the author.

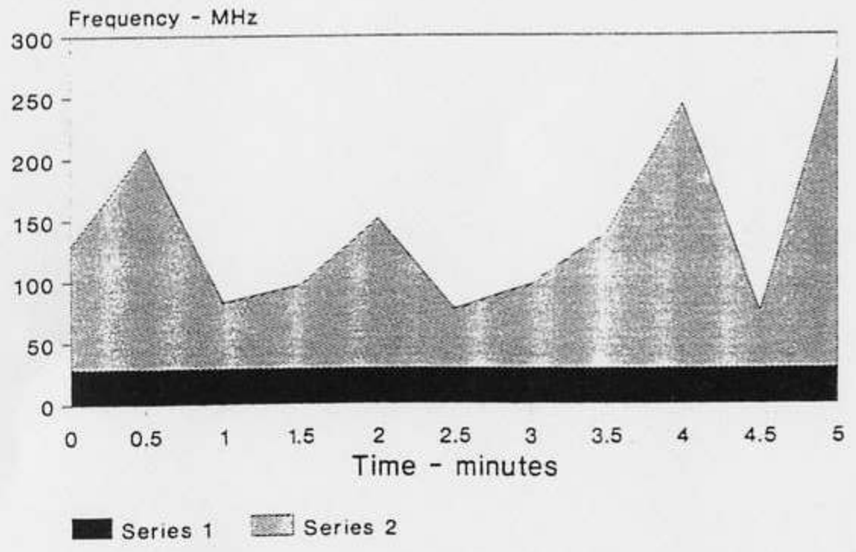

Figure 3

Series 2 shows the variation in a single frequency, for the same single cell used for Figure 2, when stimulated by a weak signal tracking a stimulating frequency as it varied. Compared with Figure 2, the period has decreased from 25 minutes to between 1.5 and 2 minutes. Series 1 shows the effect of re-setting the frequency generator to an adjoining depressing frequency; all frequency jumping has ceased.

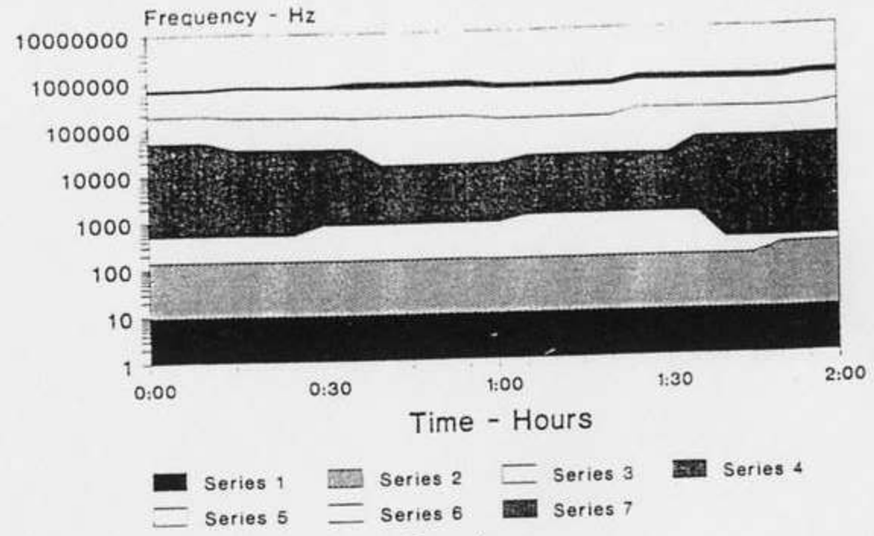

Figure 4

A full set of frequencies for a human subject (CWS) taken over a two-hour period in the absence of any intended frequency stimulation. The odd-numbered Series are the stimulating frequencies, the even numbered Series are the depressing frequencies. The frequency range extends from 9.5 Hz to several MHz. The only frequency not to jump was 9.5 Hz, the periodicities of the other frequencies differed but were of the order of two hours.

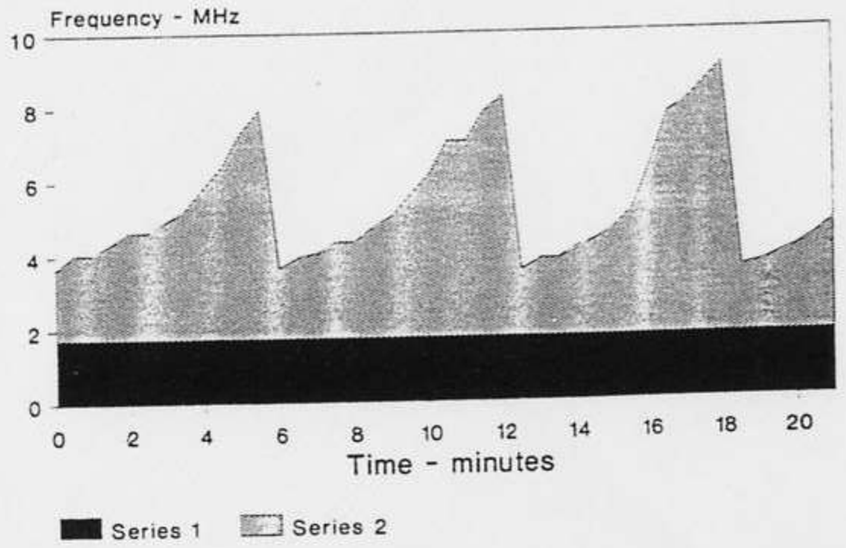

Figure 5

Series 1 shows the effect of setting an oscillator to the highest depressing frequency of Figure 4. All frequency jumping has ceased. Series 2 shows the effect of re-tuning the oscillator to the highest stimulating frequency of Figure 4. The periodicity has reduced to six minutes and the amplitude of the jumping has increased to 100%.