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**Transfer of molecular information
using a bioresonance instrument (BICOM)
in amphibian trials
(controlled blind study)**

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Summary

Two independent double-blind studies, performed in Austria and Italy, demonstrated that bioinformation can be scanned and transferred by a bioresonance instrument (BICOM). The metamorphosis of tadpoles could be greatly slowed down by transferring information from a toxic solution of the hormone thyroxin to the aquarium water in a number of parallel trials.

Key words

Molecular information, bioresonance instrument, BICOM, amphibia, metamorphosis

"The metamorphosis of tadpoles can be slowed down by the transfer of information from a highly concentrated hormone solution"

Introduction

Thyroxin and the metamorphosis of tadpoles

The tests discussed in this paper are based on the generally known fact that the hormone thyroxin plays an essential part in the metamorphosis of amphibia. The transformation from fish-like tadpoles to land-based, four-legged frogs is generally initiated and promoted by this iodine-containing hormone which is generated in the thyroid gland [1]. On the other hand, if thyroxin is introduced into aquarium water in a high molecular concentration (e.g. log 6 parts by weight or above), then metamorphosis is slower or even stops altogether.

Two possibilities for scanning information from thyroxin molecules

Our preliminary tests on scanning the information from thyroxin molecules were performed in two areas. On the one hand this involved the 'homeopathic' method of stepwise dilution and agitation of a highly concentrated, that is metamorphosis-inhibiting, stock solution; here the thyroxin-bonded information from the thyroxin molecule was scanned by using the *Hahnemann* method. In another stage, this information was also digitalised (*F. Senekowitsch et al.*).

On the other hand, the preliminary tests used electronic scanning of this type of solution using the bioresonance method.

Retaining the thyroxin effect without the thyroxin molecule

These two methods produced the interesting finding that the effect of concentrated molecular thyroxin (log 3, slowing of metamorphosis) can be retained by both procedures, evidently independently of the thyroxin molecules.

Strategy

The strategy of the project (1989-1995) was first to describe the methods and results from the preliminary study, in scientifically recognised publications. This was done, in particular for the homeopathic method, in a conventional toxicological journal [2] and within the context of a book published by a highly regarded scientific publisher [3, 4], and for both methods within the context of a conference of the American Association for the Advancement of Science [5]. Furthermore, the hypotheses derived from the bioresonance preliminary study were communicated to the Federation of American Societies for Experimental Biology, FASEB, the American Association for Experimental Biology. A corresponding announcement was published by this association in the Spring of 1993 [6]. The route to a major study, be it positive or negative, was thus prepared.

Following this, we were offered the opportunity of performing this type of major study using a BICOM instrument.

The study described in this paper was designed as basic research and should be understood to be simply that. It investigated whether the scanning and transfer of bioinformation using this instrument was possible. Direct therapeutic conclusions should not be made at this point.

General information about the BICOM instrument

The BICOM instrument (Brügemann Co.) includes a diagnostic section for measuring the electrical dermal resistance at acupuncture points, wherein the dermal resistance is given as a standardised value on an analogue scale. Furthermore, it also includes a therapy section; the work presented here used only this therapy section.

This therapy section is intended to receive and amplify bioinformation by means of a direct current amplifier.

According to the information from the manufacturers, these signals can be switched as required between 10 Hz and 150 kHz with a selective bandpass sweep, by a combination of amplification, signal inversion and filtering. If bandpass filtering is not used, a frequency range up to more than 1 MHz is transmitted. The *signal output*

can be used in the sense of bio-feedback, or to pass preselected bioinformation to a patient or *to pass bioinformation to a substance such as water*.

The preliminary study

In the preliminary study, the transfer of information from a 1.25 mM thyroxin solution to water using an electronic amplifier was tested (see below for details; Methods). The effect of this test liquid on the transformation of two-legged to four-legged tadpoles of *Rana temporaria* and also on juvenile frogs was then investigated [see also 7] (fig. 1).

144 animals were subjected to water to which the information from a 1.25 mM thyroxin solution had been transferred and 144 animals were subjected to water to which the information from water alone had been transferred.

A slowing of the rate of metamorphosis was observed under the effect of the test liquid as compared with the controls. This was shown to be statistically significant. The number of animals which had reached the target stage at each of the observation points was generally smaller in the test liquid group ('T' in table 1) than in the control group ('W').

Methods used in main study

Larvae of the brown grass frog *Rana temporaria* from a pond 400 m above sea-level (St. Oswald, Steiermark, Austria) were used for this study. The Austrian part of the study was performed indoors at St. Oswald, the experiments were started on 13th and 20th of May.

We selected only two-legged tadpoles which had already started to develop rear legs, with their rear legs splayed out far enough for it to be possible to see through the angle between the tail and the upper and lower parts of the leg (comparable to about stage 31 according to *Gosner*) [8]. The transformation from this stage to the four-legged stage normally then takes less than one week.

During this period, the front legs are pre-formed under the skin. The end of this transformation is marked by the last (second) front leg breaking through, which takes

place within a few minutes of completing the preceding development stages. In addition to the target criterion of possessing four legs, it was also noted when the animals reached the stage when the tail had largely disappeared (fig. 1).

Preparing the test and control substances

The tadpoles were observed under the effect of a test and a control liquid, these being prepared as follows:

20 ml of a suspension of 1.25 mM sodium thyroxin pentahydrate (Sigma Co.) were introduced into distilled water (corresponding to log 3 parts by weight, or 1000 ppm) at 20°C in a 30 ml glass bottle. In order to achieve uniform dilution and to transfer any thyroxin information to the water, this partly filled bottle was first agitated by hand, by tapping the bottle 30 times against the palm of the left hand over the course of one minute.

The bottle containing the solution was then placed inside a metal can which acted as a coil and was connected to a specially made high sensitivity amplifier, as described below. An identical bottle containing 100 ml of pure tap water was placed inside a metal can which acted as the output coil.

A standardised programme (amplification = 40x, interrupted = 7 sec 'on' / 3 sec 'off', duration = 15 min.) was used in order to transfer bioinformation from the bottle containing the thyroxin solution in the input coil to the bottle containing water in the output coil (fig. 2). Then the liquid in the output coil was agitated again, as described above. The result is called 'thyroxin-informed liquid' in the following. In order to prepare a 'control', the same procedure was followed, but with the difference that a bottle containing distilled water was used instead of the thyroxin solution in the input coil. The bottle in the output coil was then labelled 'water-informed liquid' (fig. 3). This transfer of water information to water served as a control against any thyroxin contamination of the beaker (coil) and against the effects of electrical signals, either from the surroundings or from the equipment itself, which might be of biological significance.

This control was, inter alia, used because the amplification set-up could not be electromagnetically screened since normal Faraday cages only filter radio

frequencies, whereas the biologically most effective frequencies would penetrate even solid metal [9]. Thus, we excluded all neutral 'noise' being transferred, to the same extent, to the test liquid and to the control liquid, with the thyroxin information being transferred only to the test liquid.

Several more bottles of thyroxin-informed and water-informed liquids were prepared in the same way. Before adding the liquids prepared in this way to the corresponding aquaria, they were again shaken a few times.

The optical transmittance of the bottles ended below 350 nm and that of each of the aquarium waters above 2500 nm.

Amplifier: Specific to the BICOM instrument

The instrument (BICOM, Brügemann) was designed by the manufacturer to receive bioinformation at an input amplifier. This is stored by rechargeable direct current batteries. The instrument is designed in accordance with safety class 3 (TÜV).

Although the amplifier can be connected as a conventional electrical circuit for calibration purposes, it normally operates with a single-pole input and single-pole output without an earth connection.

The reasoning behind this is the assumption that the relevant bioinformation is a coherent signal and not a time-dependent voltage or flow of current. This type of coherent signal (see below; Discussion), is transmitted along a single wire (e.g. a PVC insulated copper wire with 5 mm banana connectors at the ends), in the same way that heat ('negative information') can be passed along a metal rod.

The BICOM amplifier itself is a broad band amplifier with extremely low distortion of frequencies, high frequency linearity, i.e. it amplifies all frequencies as uniformly as possible, that is with the same amplitude, and an extremely small phase-shift (phase angle rotation) during amplification.

This is required when amplifying bioinformation since this appears to be coherent. (Fixed relationships between the phases of otherwise separate waves make these waves coherent). Coherence is therefore a measure of the precision of the speed, the frequency and the wavelength of the individual waves. This also makes interference effects between the individual waves possible [9].

If the output from the amplifier is compared with that from a normal oscilloscope, then at first it simply looks like noise. However, in spite of some unsolved technical problems, a coherent signal can be produced by using an appropriate signal analyser or a narrow band filter [9]. A physical explanation of the storage of this type of information in the liquid water will be given later (see the Discussion).

Encoding and adding the water

The two sets for the sequential experiments were encoded by an independent member of the University of Graz (*A. Nogrask*). Both sets were used blind. The test and control liquids were each introduced, by adding 8 ml portions of the relevant liquid to 8 litres of water which contained the animals, at intervals of 8 hours. Then the tanks were stirred gently. The same amount of water (8 ml) was then pipetted out of the aquarium each time.

Non-invasive design of the trial

On reaching the stage with a reduced tail, the animals were returned to their natural habitat.

Further details, set up

White disposable plastic beakers were used. The temperature of the pondwater in these was $18.5 \pm 0.5^{\circ}\text{C}$. The beakers were placed in indirect natural light and the tadpoles were fed ad libitum on cooked lettuce leaves. The positions of the aquaria were rotated over the course of the trial. The animals were observed at intervals of 8 hours, until about 90% of the animals in one of the groups being compared (test liquid against control liquid) had reached the target stage. The development of the remaining 10% was not observed since this would normally be delayed. 18 animals were used in each aquarium. A total of 26 individual beakers or 13 pairs of beakers were observed during the main trial (fig. 4).

Statistics

To evaluate the data, the total (cumulative) number of animals which had reached the four-legged stage was counted for each of the two groups and compared with the total of those animals which had not reached this stage (a) (fig. 4).

In the same way, the total number of animals with reduced tails was counted and compared in (b).

For each measurement interval, that is every 8 hours, the data were compared using a chi squared test. Special note was taken of the measurement point at which about 50% of the animals had reached the target stage.

Results of the main study

The trials involved a total of 468 animals. Fig. 5a shows the increase in the number of four-legged animals among those treated with the test liquid (black squares) and the increase in four-legged animals among the controls (white squares). Fig. 5b shows the increase in the number of tailless animals among those treated with the test liquid (black circles) and the increase in the number of tailless animals among the controls (white circles). The absolute numbers are given in table 2.

The diagrams demonstrate that the animals subjected to the test liquid reached the target stage, as indicated by the same number of controls reaching the target stage, only after a delay of 8 to 20 hours.

The evaluation showed that this difference was also statistically significant (see table 2).

Discussion of the results; control trial

Status of the project

The present study was designed to attempt to transfer information from a molecular thyroxin solution ($1:10^3$, for normal metamorphosis inhibition) to water which had not been pretreated. Two transformations during the metamorphosis of the brown grass frog were tested under the effect of this test liquid.

The results of the study (1994) are consistent with those from the preliminary tests published in 1993. The test liquid, i.e. the information from thyroxin transferred by means of the electronic instrument, produced a statistically significant slowing down in the rate of metamorphosis.

These results will be reported in a corresponding publication in the context of the American Association for Experimental Biology (FASEB) [10].

Control trial

The next step in this type of project requires an independent control trial to be performed in a laboratory other than our own.

Such an independent control experiment was performed in Italy under the patronage of the University of Urbino (table 3). This confirmed the results previously obtained in Graz. A slowing down in the rate of metamorphosis was observed under the effect of the test liquid, as compared with controls.

These studies, which are soundly based from a zoological point of view, provide further evidence of the existence of biosignals and the possibility of electronically processing such signals. Inter alia, questions relating to the following biophysical factors are raised:

- a) The interaction between the molecular substance thyroxin and (the liquid surrounding the molecules and) the metal in the input coil.
- b) The break-down of the bioinformation signal into time-dependent variations of voltage and current strength in a man-made amplifier.
- c) The transfer and storage of electromagnetic information to the solvent water.
- d) The physiological basis of the sensitivity of living organisms to this type of information and the mechanism of the interaction of bioinformation with the organism.

a) Bioinformation

It is generally known that biomolecules emit electromagnetic signals. Even radio astronomers observe this type of information.

To any physicist, it is a commonplace fact that atoms and molecules consist of quanta which can be described not only as particles but also as waves or energy fields.

Independently of the mathematical/theoretical aspect, quanta may be described as either corpuscular particles or as electromagnetic fields or as vector fields. However,

this form, the actual thing to observe, is not always taken into account when thinking about biological and medical concepts of life and health.

The charge on an electron, naturally, is electrostatic, but it can behave like an electromagnetic wave. Thus the information from atoms and e.g. molecules consists of the (smeared out) electromagnetic field of the electrons and nucleons. Due to the final temperature of the molecular system, molecules may be held in specific rotational and vibrational states (modes). These modes are coupled to those of other molecules and to external fields in a very complex manner.

It is conceivable that there are also other phenomena which take precedence over the electromagnetic fields [9].

The rotational states are located in the infra-red region, the thermal vibrations of the molecules and clusters occur in both this region and in the longer wavelength region. The special feature of low-energy bioinformation seems to be the coherence of these types of vibration patterns. Fixed relationships between the phases of otherwise separate waves makes these waves coherent.

This also makes possible the occurrence of interference effects between individual waves. This type of coherent, e.g. electromagnetic, signal can be propagated along a metal wire, with the help of an input coil, in exactly the same way as heat can be passed along a metal rod.

The expression 'propagating coherence' is used here (rather than an 'electric circuit') which is promoted by 'electron hopping' [7]. Electron hopping may also play a supporting role in the management system within a living organism. The dielectric properties of enzymes also indicate this. (In the same way as a camera or a microscope copies the principles of a human eye, the BICOM instrument can copy the principles of communication within an organism). One pointer to the necessity of free transfer electrons between the scanned molecular substance (thyroxin) and the organism is also provided by the experimental finding that although many types of glass are suitable for the container of the information-carrying solution, plexiglass (perspex) is not. Insulators such as perspex have about one free electron per cm^3 , whereas in the case of hard glass the number is an order of magnitude greater and with metals there is one transfer electron per atom. A critical electron or proton density seems to be required in order to build up the long-range order.

b) Events in the amplification process

The principles of the BICOM amplifier, a broad band amplifier with an extremely low distortion of frequencies, high frequency linearity and extremely low phase rotation were described briefly in the Methods section. Although answering detailed technical questions is often against commercial interests, it now seems beneficial to have as precise as possible data on the electronic details in order to promote scientific appraisal and acceptance of BICOM resonance therapy.

c) The water at the instrument output

It can be assumed that electromagnetic (and other?) information from the amplifier interacts with the fields of molecules and molecular groups in the water. Even normal water is a highly structured substance, on a number of hierarchical levels: it consists of fractions (phases) with different physical properties which are supported by species known and described as clusters. Water molecules form coherent (LASER-like) communicating groups due to their dipolar structure [10]. Additional polarisation of the water molecules can now occur as a result of the electromagnetic bioinformation. In pictorial terms, the previously coherent phases are now 'aligned' in the same way as a computer diskette which is first formatted and then 'informed'. In the case of these types of groups, though, the expression 'information retaining process' is more appropriate than 'information retaining structure'.

In addition to this explanatory approach, the natural diversity of the (hydrogen and oxygen) isotopes in the solvent water ('isotopicity' of naturally occurring atoms of the same type with different masses) and their ability to determine the interactions between the vibrations of the water molecules should be mentioned. This coupling of vibrational modes may also stabilise certain information (*Berezin* in [4]). These two theoretical approaches complement each other to produce a thermodynamic theory, the interaction of the electrons (coherent dipole vibrations) being coupled to the

vibrations of the rest of the atom (electron-photon coupling). Long-range electromagnetic waves seem to occupy a key role in this type of coupling [12, 13].

In this connection, trials with thyroxin-informed water in which specific resonance frequencies of the liquid have been determined are of interest [14].

d) Interactions with the organism

The existence of energetic interactions has been described as a fundamental fact of the phenomenon known as 'life'. The transmission of signals forms the basis of BICOM resonance therapy.

A possible working hypothesis suggests that the fundamental effect of exogenic bioinformation is based on delocalisation of energy in a resonance-like interaction between the transmitter (the organism) and the receiver (BICOM bioinformation). The appropriate information pattern can thus absorb e.g. pathological or stress-related vibrations by making the highly sensitive biofeedback system in the organism oscillate like a passive resonator. Either negative or positive resonance phenomena (extinction or amplification while superimposed) may occur. An analogy to amplification would be the possible effects of microphone/high-power loudspeaker coupling in an empty conference hall. It seems to be very important for the future that appropriate resources are found for reaching a wider audience and also for further research.

References

Other models

Interesting results on the electronic transfer of bioinformation were found in our study group with regard to having an effect on the growth of wheat seeds and also on the induced emission of biophotons in the case of acetabularia (*Citro* with support from *F.A. Popp*) [14]. Reference is also made to the papers by *J. Benveniste* [15] and *G. Lednyczky* et al. and *F. Senekowitsch* et al. [124].

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Table 1: Effect of test liquid on the metamorphosis of amphibia; preliminary trial

Transformation to the four-legged stage											
W (total = 144)											
N =	10	16	25	49	65	76	90	100	112	119	127
% =	6.9	11.1	17.4	34.0	45.1	52.8	62.5	69.4	77.8	82.6	88.2
T (total = 144)											
N =	9	13	17	41	47	52	78	87	90	99	114
% =	6.3	9.0	11.8	28.5	32.6	36.1	54.2	60.4	62.5	68.8	79.2
	-	-	-	-	*	**	-	-	**	**	*

W: Absolute and relative number of animals in the control group which have reached the defined stage at 11 sequential measuring points (depending on the experiment, time intervals of 8 or 16 hours).

The standard deviation was about 10% each time.

T: The corresponding numbers for animals in the test group:

** P < 0.01; * P , < 0.05; - P > 0.05 in chi squared test.

Fig. 5: Effect of the test liquid on the transformation from two-legged to four-legged tadpoles (a) and to animals with a reduced tail (b).

Table 3: Effect of test liquid on the metamorphosis of amphibia: main study

Transformation to the four-legged stage												
W (total 234)												
27	29	60	81	99	120	143	163	169	176	191	201	209
T (total 234)												
21	22	35	59	75	92	118	135	140	153	164	171	188
-	-	**	*	*	**	*	**	**	*	**	**	**
Transformation to stage with reduced tail												
W (total 234)												
25	26	62	71	89	118	128	144	155	174	186	195	207
T (total 234)												
17	28	48	53	70	93	108	123	138	153	167	184	194
-	-	-	-	-	*	-	*	-	*	-	-	-

Table 3: Effect of test liquid on the metamorphosis of amphibia (independent repetition of the trial)

Transformation to four-legged stage								
W (total 90)								
18	29	40	47	57	62	71	78	80
T (total 90)								
11	21	25	33	38	47	51	57	63
-	-	*	*	**	*	**	**	**