

CONTROVERSIES IN TOXICOLOGY

Non-Molecular Information Transfer From Thyroxine to Frogs With Regard to Homeopathic Toxicology

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Research on the scientific basis of homeopathic toxicology can generally proceed along 3 lines: The principles underlying inversion effects of specially prepared dilutions (1,2); or the biophysical properties of the information transfer process. Substances so dilute that no original molecule is present still exert biological effects, ie molecular bio-information may be transduced via water (3-8) and hence inhibit climbing activity of juvenile frogs (2). In the work presented here, we studied the thyroxine-controlled metamorphosis of the amphibian *Rana temporaria* from the 2- to the 4-legged stage in basins each containing 18 animals. These blind experiments were carried out between 1990 and 1994 in several independent laboratories.

In **Experiments A** the influence of a high dilution of thyroxine (10^{-30} M) prepared in a special process of stepwise dilution and agitation (2) or similarly diluted water was tested. These probes were directly added to the basin water at regular intervals (8, P 48).

In **Experiments B** vials of the 10^{-30} M thyroxine dilution or water were placed on an input coil linked to a filter and to an amplifier with a gain of 10^6 . Frequencies up to 80 kHz were digitized at the Nyquist frequency, buffered in a RAM and multiplexed on to a CD. After noise reduction and filtering, the signal was attenuated by 10^6 to restore the original analog level. Water vials were placed for 4 min on an output coil (device = Fa Hoefler, Austria). The probes were directly placed in the basin water.

In **Experiments C** vials of 1 mM thyroxine or water were placed on an input coil one end of which was connected to a special amplifier (linear from DC to HF) by a single insulated wire (device used in the main study = Fa Brugemann, Germany). Water vials were placed for 4 min on a similar output coil. The probes produced were directly placed in

the basin water.

In **Experiments D** the 10^{-30} M thyroxine dilution and similarly prepared water were sealed in hardglass vials hung in the basin water. Before adding the probes, there were always 18 animals at a well defined 2-legged stage (Gosner's stage 31; 9) randomly allocated to each basin. After 0.5-2 w the forelimbs of the animals were preformed under the skin. When break-through occurs, it does so within a few minutes. Cumulative frequencies (F_c) of occurrence of 4-legged animals were monitored. Details of the methods have been described (10).

During each treatment, the F_c of the 4-legged frogs decreased in all of the experiments (Table 1, Fig 1). In other words, the chance of entering the 4-legged stage was generally smaller in the groups treated with the information from thyroxine than in the control groups. Information from molecular

Table 1: Non-molecular information transfer from thyroxine to frogs. For initials, see list of authors and Acknowledgements; () = additional confirmatory results obtained with slightly different methodology. For further explanations see text. Data also significant in t-test and survival analysis. Experiments A and B have to be performed when natural metamorphosis proceeds relatively slowly (September), whereas Experiments C and D have to be performed when natural metamorphosis proceeds relatively fast (May, June) (14).

Experiment	Decrease in F_c	N of animals	P (chi*2 test)	Researchers	Reference
A	9%	522+522	0.001	PCE,WP (RvW, CV)	10
B	14%	234+234	0.001	WP	11
C	13%	468+468	0.001	WP, CV	12
D	21%	612+612	0.001	PCE,WP,KW (HH, CV)	13

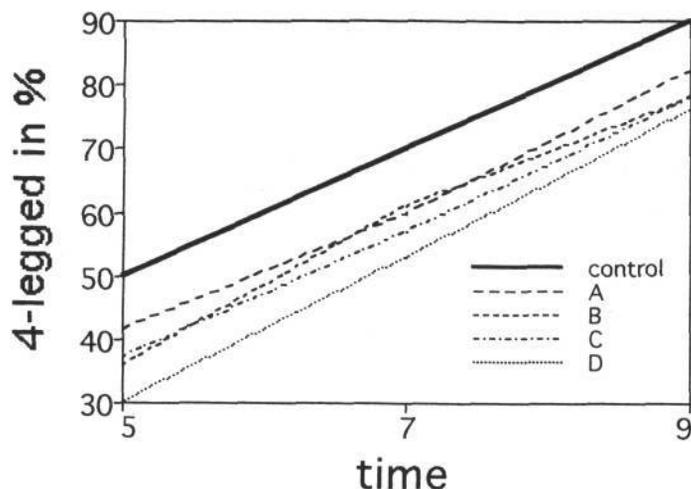


Figure 1. Non-molecular information transfer from thyroxine to frogs. Ordinate = Cumulative frequency (F_c) in % of 4-legged frogs. Abscissa = time, depending on the experiment in equal intervals of 4-40 h. A-D = Cumulative frequencies of groups treated with the thyroxine information in Experiments A-D. Control = Normalized cumulative frequencies of the respective control groups. $1\text{ SD} \leq 10\%$.

thyroxine can be transferred by a process of stepwise aqueous dilution and agitation or by means of an electronic circuitry (15-19), it can be stored on a compact disk (20), and it can exert its effect through the wall of a sealed glass vial. This leads to the conclusion that this bio-information is electromagnetic in nature and can be processed by conventional electronic circuits and devices.

Recent physics research revealed that water dipoles may develop phase coherent oscillations through radiation coupling (21,22). It was proposed that these could be modulated as a time-ordered pattern of signals (8, p 119) and could induce the coherent wave propagation in metals (8, p 213). Additional theory suggests that the phase coherent oscillations may originate information pattern formation through isotopicity effects in high dilutions (8, p 245). The theoretical physics aspect of Experiments A-D reported here has to be evaluated to test and develop a theory about the bio-information storage and transfer observed in homeopathically prepared dilutions.

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