

Memory of water and blinding

Sir,

As one of the co-authors of the "famous" article in *Nature* in 1988¹ on high dilutions and a former member of the Benveniste's team, I would like to comment the recent article "*The history of the Memory of Water*" by Yolène Thomas.² She reports some of the problems with reproducibility encountered during the "memory of water" experiments, and suggests that uncontrolled parameters (eg electromagnetic pollution or quality of water) were most probably responsible when poor results were obtained. I do not fully agree with this presentation of the events. Indeed, the difficulties of reproducibility were quite atypical and did not appear to result from a weak "signal" among a noisy background. This was obvious with the experiments on isolated heart and with the coagulation experiments. The main issue was that in some circumstances, "effect" and "no effect" were randomly distributed regardless their origin (negative or positive samples).

The strangeness of these disturbances was particularly highlighted during the demonstrations that J. Benveniste organized regularly with the isolated heart system to convince other scientists of the reality of the phenomenon. These demonstrations were generally performed in two steps. In a first step, negative and positive samples were produced (high dilutions, samples of "informed water" or digital files) and were blinded with a code by an observer not belonging to the Benveniste's team. Some negative and positive samples were kept unblinded. In a second step, Benveniste's team tested all samples (blinded and unblinded). When all measurements were complete, the results were sent to the observer and the code was broken.

In these demonstrations, the biological effects (and absence of effect) were usually clear-cut. However, the results of blinded samples were almost always at random and did not fit the expected results: some "controls" were active and some "active" samples were without effect on the biological system. We could indeed hypothesize that active samples had been "erased" by external influence. It is however more difficult to explain how inactive samples had been transformed into "active samples". And we are unable to explain why the open samples (positive and negative samples), prepared and tested at the same time as blinded samples, gave systematically correct (ie expected) results.

It is difficult to summarize these numerous and disturbing experiments in a few lines, but I have described them in details in a recent book that tells the whole "memory of water" story.³ This can be read free on Internet (www.mille-mondes.fr): despite the successive technical improvements of the different experimental systems, the weirdness persisted. Taking these experiments as a whole, it appears that the results reflected more the expectations of the experimenters (and of the lab team) than supposed properties of the samples.

These strange results culminated with the DARPA experiments performed in 2001 on the coagulation

model using an automatic robot analyzer. Again the importance of the experimenter was confirmed, but the experts could not conclude that an effect related to "digital biology" had been evidenced. Interestingly, the experts of the team commissioned by DARPA concluded⁴ that unknown "experimenter effects" could explain these odd results, but that a theoretical framework was necessary to comprehend them; and they added: "*Without such a framework, continued research on this approach to digital biology would be at worst an endless pursuit without likely conclusion, or at best premature.*"

I fully agree with this conclusion. Indeed, if the presence of certain people is necessary to obtain a biological effect whereas other people "block" it, are we talking about water properties? We all know that water is fascinating, but perhaps it is time now to ask whether water is really involved in the biological effects of the "high dilutions" and "digital biology". The fact that a simple blinding of the experimental samples induced such trouble is, in my opinion, the key to understand what occurred during the "memory of water" story and the "high dilutions" experiments reported by other teams. The early experiments with basophils were also not free from blinding disturbances. Indeed, the usual large and regular waves of degranulation (or inhibition of degranulation) routinely obtained by some teams became unnoticeable during large-scale blind experiments.^{5,6}

In conclusion, I propose that systematic assessment of blinding *vs* no blinding should be performed by authors investigating "high dilutions" (or related) effects. Of course blinding of the samples should be performed by an independent scientist who does not take part in the experimental process. But perhaps some will prefer an "*endless pursuit*".

References

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