

Is high dilution a myth?

The laws of chemistry state that there is a limit to the dilution that can be made without losing the original substance altogether. This limit, which is related to Avogadro's number (6.0×10^{24}), corresponds to homeopathic potencies of 12C or 24X (1 part in 10^{24}).

Hahnemann (the founder of homeopathy himself realized that there is virtually no chance that even one molecule of the original substance would remain after extreme dilutions. *But he believed that the vigorous shaking or pulverizing with each step of dilution leaves behind a "spirit-like" essence—"no longer perceptible to the senses"—which cures by reviving the body's "vital force."* Modern proponents assert that even when the last molecule is gone, a "memory" of the substance is retained.

"What I can say now is that the high dilutions are right. High dilutions of something are not nothing. They are water structures which mimic the original molecules..." (Professor Luc Montagnier, a French virologist who co-discovered HIV and who won the Nobel Prize in 2008 & founder and president of the World Foundation for AIDS Research and prevention)

15.1. "Thermoluminescence of ultra-high dilutions of lithium chloride & sodium chloride" - Lausanne, Switzerland.

Citation and Link:

Louis Rey, "Thermoluminescence of ultra-high dilutions of lithium chloride and sodium chloride", *Physica A* 323 (2003) 67 – 74.

<http://www.homeopathy.org/research/basic/Rey.pdf>

Method: "Ultra-high dilutions of lithium chloride and sodium chloride (10^{-30} g cm^{-3}) have been irradiated by X- and γ -rays at 77 K, then progressively rewarmed to room temperature. During that phase, their thermoluminescence has been studied".

Results: "It was found that, despite their dilution beyond the Avogadro number, the emitted light was specific of the original salts dissolved initially."

15.2. "Is Aconite 30C (a homeopathic medicine without any particle of medicine in it: equal to water) placebo?" - Research Department, Paracelsus Hospital, Richterswil, Switzerland)

Citation and Link:

Piltan D, Rist L, Simões-Wüst P, Saller R, „Test of a homeopathic dilution of Aconitum napellus. A clinical, randomized, double-blind, controlled crossover study in healthy volunteers”, *Forsch Komplementmed*. 2009 Jun;16(3):168-73. Epub 2009 Jun 5.

<http://www.ncbi.nlm.nih.gov/pubmed/19657201>

Method

“From the 33 subjects randomized for this double-blind, placebo-controlled crossover study, 27 could be included in the analysis. The study comprised two 7-day-long treatment periods, each including the intake of a study preparation for 3 days and a wash-out period of 4 days. One group was first treated with Aconitum napellus C30 and then with placebo; the other group received the two study preparations in the reverse order. The signs and symptoms before the first treatment and after each treatment were collected, evaluated, weighted and repertorized. Based on this classification the blinded physician assessed these signs and symptoms as study outcome parameter to represent the responses to each of the study preparations. Statistical analysis of the data was performed using the Wilcoxon-Mann-Whitney rank test”.

Results: “A clear difference between the reported short-term reactions of healthy subjects towards Aconitum napellus C30 and towards placebo was shown. The crossover design with intra-individual comparisons proved to be adequate to recognize the study preparations and for the statistical analysis of a small population sample”.

15.3. "Physical modifications in the solvent of ultrahigh aqueous dilutions of histamine" - Nuclear Medicine Department of the General Hospital in Haguenau, France.

Citation and Link:

Demangeat J-L, "NMR water proton relaxation in unheated and heated ultrahigh aqueous dilutions of histamine: Evidence for an air-dependent supramolecular organization of water", *Journal of Molecular Liquids*, 2009, 144:32-39

<http://www.homeopathyeuropa.org/news-and-press/newsletter/editions/high-dilution-effect-reported-in-nmr-study>

Method:

"20-MHz R1 and R2 water proton NMR relaxation rates were measured in ultrahigh dilutions (range $5.43 \cdot 10^{-8}$ - $5.43 \cdot 10^{-48}$) of histamine in water (Hist-W) and in saline (Hist-Sal), prepared by iterative centesimal dilutions under vigorous agitation in controlled atmospheric conditions. Water and saline were similarly and simultaneously treated, as controls. The samples were immediately sealed in the NMR tubes after preparation, and then code-labelled."

Results: "Unexpectedly, histamine dilutions remained distinguishable from solvents up to ultrahigh levels of dilution (beyond 10^{-20} in Hist-Sal)...was suggested that stable supramolecular structures, involving nanobubbles of atmospheric gases and highly ordered water around them, were generated during the vigorous mechanical agitation step of the preparation, and destroyed after heating".

15.4. "A nuclear magnetic resonance spectroscopy comparison of 3C trituration derived and 4C trituration derived remedies" - Department of Homoeopathy, Faculty of Health Sciences, Durban University of Technology, South Africa.

Links:

Bothal, Ross AH, "A nuclear magnetic resonance spectroscopy comparison of 3C trituration derived and 4C trituration derived remedies", *Homeopathy*. 2008 Oct;97(4):196-201.

<http://www.ncbi.nlm.nih.gov/pubmed/19371568>

Aim & Method:

"This study sought to establish whether the claim that C4-derived potencies possess different physicochemical qualities to the homoeopathic medicines derived from a 3cH trituration is valid. All potencies were produced by hand according to the German Homoeopathic Pharmacopoeia (GHP). Five different samples were analysed using Nuclear Magnetic Resonance (NMR) Spectroscopy."

Results: "...Trituration plays a part in the development of physicochemical properties specific to homoeopathic medicines. *The higher the level of trituration, the more pronounced is the alteration of the physical structure of the active ingredient.* The study concludes that 4cH potencies are physicochemically distinct from 3cH-derived potencies."

15.5. “Characterization of the structure of ultra dilute sols with remarkable biological properties”- Materials Research Institute, Pennsylvania State University, USA.

Citation and Link:

Manju Lata Rao, Rustum Roy, Iris Bell, “Characterization of the structure of ultra dilute sols with remarkable biological properties”, *Materials Letters* 62 (2008) 1487–1490.

<http://rustumroy.com/Scans/803.pdf>

Aim:

“Most natural waters are probably “ultra dilute”: aquasols. While the composition of such waters is routinely characterized thoroughly with respect to composition, very little attention has been paid to the solid phases which are certainly suspended in most, if not all, such. Our recent work having established the importance of the structure of water on its properties, [[1]; R. Roy, W.A. Tiller, I. Bell, M.R. Hoover; *Mater Res Innov.* 9 (2005) 577.] we have examined the structures of many water with easily demonstrated (e.g. silver aquasols) or long-claimed (e.g. homeopathic remedies) biological effects”.

Results:

“From this preliminary study, it is rather *clear that even an ultradilute sol is indeed structurally different from the pure liquid solvent phase*. The data on the ultradilute sols prepared with succussion, show clear differences between the differently treated samples. This suggests that whether due to epitaxial effects, effects from the “pressure, 2nd phases, or nanobubbles caused by the succussion, the differences are real”.

15.6. **“Electromagnetic signals are produced by aqueous nanostructures derived from bacterial DNA sequences”** - Nanectis Biotechnologies, France

Link:

Luc MONTAGNIER, Jamal AÏSSA, Stephane FERRIS, Jean-Luc MONTAGNIER, Claude LAVALL'EE, “Electromagnetic Signals Are Produced by Aqueous Nanostructures Derived from Bacterial DNA Sequences”, *Interdiscip Sci Comput Life Sci* (2009) 1: 81–90.

<http://www.homeopathyeurope.org/downloads/MontagnierElectromadneticSignals.pdf>

Study:

“A novel property of DNA is described - The capacity of some bacterial DNA sequences to induce electromagnetic waves at high aqueous dilutions. It appears to be a resonance phenomenon triggered by the ambient electromagnetic background of very low frequency waves. The genomic DNA of most pathogenic bacteria contains sequences which are able to generate such signals...”

15.7. Extreme homeopathic dilutions retain starting materials: A nanoparticulate perspective -
Department of Chemical Engineering, Indian Institute of Technology (IIT), Mumbai, India

Citation and Link:

Prashant Satish Chikramane Akkihebbal K. Suresh, Jayesh Ramesh Bellare and Shantaram Govind Kane, Extreme homeopathic dilutions retain starting materials: A nanoparticulate perspective, Homeopathy (2010) 99, 231e242.

<http://www.iberhome.es/boletin/docs/extdilu.pdf>

Abstract:

Homeopathy is controversial because medicines in high potencies such as 30c and 200c involve huge dilution factors (10^{60} and 10^{400} respectively) which are many orders of magnitude greater than Avogadro's number, so that theoretically there should be no measurable remnants of the starting materials. No hypothesis which predicts the retention of properties of starting materials has been proposed nor has any physical entity been shown to exist in these high potency medicines. Using market samples of metal-derived medicines from reputable manufacturers, *we have demonstrated for the first time by Transmission Electron Microscopy (TEM), electron diffraction and chemical analysis by Inductively Coupled Plasma-Atomic Emission Spectroscopy (ICP-AES), the presence of physical entities in these extreme dilutions, in the form of nanoparticles of the starting metals and their aggregates.*

15.8. Quasi-quantum phenomena: the key to understanding homeopathy - Department of Theoretical Chemistry, Faculty of Chemistry, Adam Mickiewicz University of Poznań, Poznań, Poland

Citation and Link:

Molski M, "Quasi-quantum phenomena: the key to understanding homeopathy", *Homeopathy* 2010 Apr; 99(2):104-12.

http://www.unboundmedicine.com/medline/ebm/record/20471613/full_citation/Quasi_quantum_phenomena:_the_key_to_understanding_homeopathy

Abstract:

"On the basis of the first- and second-order Gompertzian kinetics it has been proved that the crystallization and its reciprocal process of dissolution belong to the class of quasi-quantum non-local coherent phenomena. Hence, there exists a direct link to homeopathy: molecules of the remedy prepared in the process of dilution of the active substance are non-locally interconnected at-a-distance. The results obtained provide strong arguments justifying formulated ad hoc macroscopic versions of quantum non-locality, entanglement and coherence employed in interpretation of the homeopathic remedies activity and effectiveness. In particular they are consistent with the predictions of the weak quantum theory developed by Atmanspacher and coworkers".