

**SIOMI**  
SOCIETÀ ITALIANA DI OMEOPATIA  
E MEDICINA INTEGRATA

**Coherence 2021**  
New frontiers in Bioelectromagnetism

**On the mechanism of actions of drug with high dilutions  
and low dose in pharmacology  
New data of laboratory and clinics**

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**Low dose therapy = Homeopathy?**

Ponderal | Low doses | Ultralow doses

TM | 5 C | 15 C | 30 C | 200 C

↑ 12 C

Avogadro's Number

**$6.023 \times 10^{23}$**

It is the number of molecules found  
in a gram-molecule (one mole) of any substance

TM  $10^{23}$

1 C  $10^{21}$

2 C  $10^{19}$

3 C  $10^{17}$

...

9 C  $10^5$

10 C  $10^3$

11 C  $10^1$

12 C

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**Homeopathy  
as an experiential phenomenon**

**Why Extreme Dilutions Reach Non-zero Asymptotes: A Nanoparticulate Hypothesis Based on Froth Flotation**

Prashant S. Chikramane,<sup>†</sup> Dhruvajyoti Kalita,<sup>‡</sup> Akkhebbal K. Suresh,<sup>†,‡</sup> Shantaram G. Kane,<sup>\*,†</sup> and Jayesh R. Bellare<sup>\*,†,‡</sup>

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**ABSTRACT:** Extreme dilutions, especially homeopathic remedies of 30c, 200c, and higher potencies, are prepared by a process of serial dilution of 1:100 per step. As a result, dilution factors of  $10^6$ ,  $10^8$ , or even greater are achieved. Therefore, both the presence of any active ingredient and the therapeutic efficacy of these medicines have been contentious because the existence of even traces of the starting raw materials in them is inconceivable. However, physicochemical studies of these solutions have unequivocally established the presence of the starting raw materials in nanoparticulate form even in these extreme (super-Avogadro,  $>10^{23}$ ) dilutions. In this article, we propose and validate a hypothesis to explain how nanoparticles are retained even at such enormous dilution levels. We show that once the bulk concentration is below a threshold level of a few nanograms/milliliter (ng/mL), at the end of each dilution step, all of the nanoparticles levitate to the surface and are accommodated as a monolayer at the top. This dominant population at the air-liquid interface is preserved and carried to the subsequent step, thereby forming an asymptotic concentration. Thus, all dilutions are only apparent and not real in terms of the concentrations of the starting raw materials.

**Chikramane et al., Langmuir, 2012, 28: 15864**

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**Langmuir**

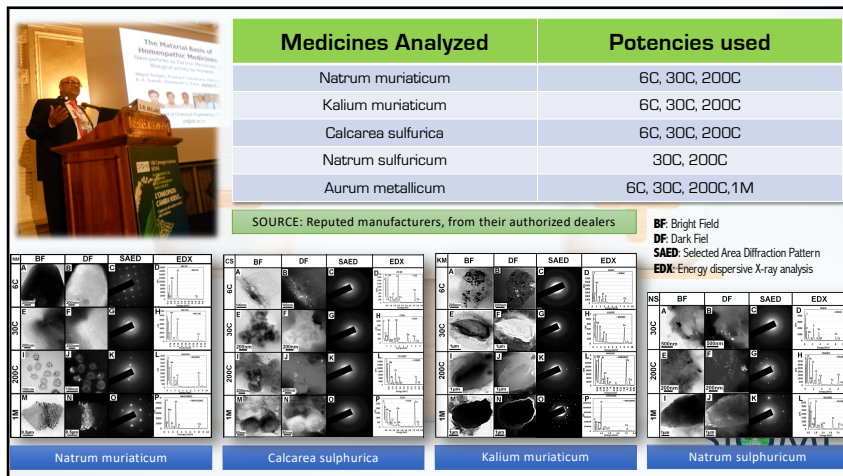
**Why Extreme Dilutions Reach Non-zero Asymptotes: A Nanoparticulate Hypothesis Based on Froth Flotation**

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**Chikramane et al., Langmuir, 2012, 28: 15864**

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## The "One Million Dollar Challenge"

OLIVIA SOLOM    SCIENCE    08.02.2011 11:09 AM

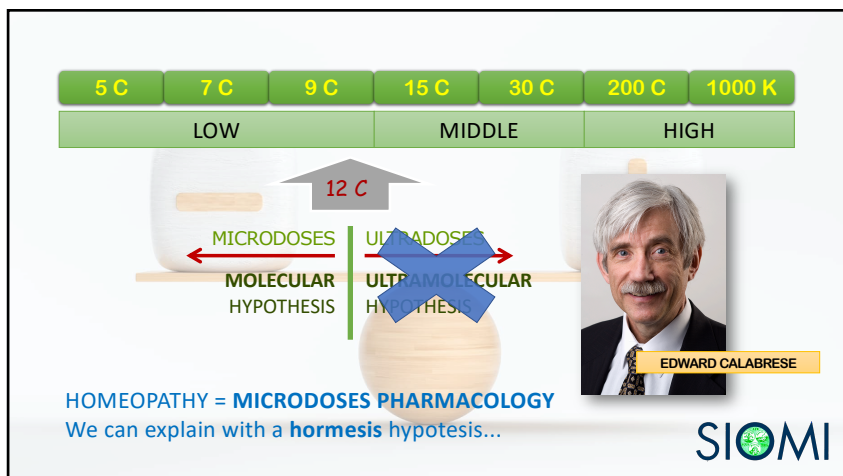
### Sceptic offers \$1 million for proof that homeopathy works

James Randi challenged manufacturers to prove their claims and win \$1,000,000 by submitting their remedies to a double blind test, consisting in identifying the only container of a homeopathic medicine beyond 30 C in the midst of dozens of containers containing pure water.

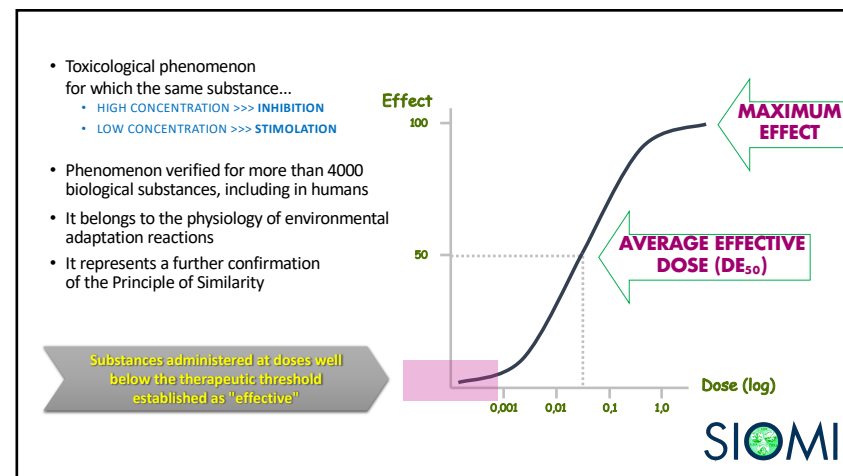
Wired, Science, 08.02.2011 - 11.09 AM

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*K B Hari Kumar et al*

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RESEARCH COMMUNICATION

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**Inhibition of Chemically Induced Carcinogenesis by Drugs Used in Homeopathic Medicine**

**K B Hari Kumar, E.S. Sunila, Girija Kuttan, K C Preethi, C Nimita Venugopal, Ramadasan Kuttan\***

The AA. have evaluated the inhibitory effects of potentized homeopathic preparations against N'-nitrosodiethylamine (NDEA) induced hepatocellular carcinoma in rats as well as 3-methylcholanthrene-induced sarcomas in mice, using Ruta, Hydrastis, Lycopodium and Thuja.

Hari Kumar KB et al., Asian Pacific J Cancer Prev, 2007, 8: 98-102

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**Results**

- ✓ Ruta 200c showed maximum inhibition of liver tumor development. Ruta 200c and Phosphorus 1M were found to reduce the incidence of sarcomas and also increase the life span of mice harboring the tumours.
- ✓ These studies demonstrate that homeopathic drugs, at ultra low doses, may be able to decrease tumor induction by carcinogen administration. At present we do not know the mechanisms of action of these drugs useful against carcinogenesis.

Hari Kumar KB et al., Asian Pacific J Cancer Prev, 2007, 8: 98-102

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*Int J High Dilution Res 2013; 12(45):162-167*

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*Original article*

**Evidence in support of gene regulatory hypothesis: Gene expression profiling manifests homeopathy effect as more than placebo**

**Santu Kumar Saha<sup>1</sup>, Sourav Roy<sup>2</sup> and Anisur Rahman Khuda-Bukhsh<sup>1</sup>**

<sup>1</sup>Cytogenetics and Molecular Biology Laboratory, Univ. of Kalyani, West Bengal, India.  
<sup>2</sup>Depart. Entomology and Inst. Integrative Genome Biology, Univ. of California, USA.

**These genes are mainly involved in transcription/translation, cell structure and dynamics, immune response, cytoprotection, enzymatic process, and receptors/ligands.**

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**Results**

- ✓ The gene expression of HeLa cells treated with **Condurango 30c** and **Hydrastis canadensis 30c** show different expression patterns of **over 100 genes** when compared to control.
- ✓ The authors suggest that this result demonstrates that **both drugs and placebo differ in their ability to trigger gene responses.**

Saha SK et al., Int J High Dilution Res, 2013, 12: 45

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## ORIGINAL PAPER

## Exploring the effects of homeopathic *Apis mellifica* preparations on human gene expression profiles



Elisabetta Bigagli<sup>1,\*</sup>, Cristina Luceri<sup>1</sup>, Simonetta Bernardini<sup>2</sup>, Andrea Dei<sup>3</sup>, Angelica Filippini<sup>1</sup> and Piero Dolara<sup>1</sup>

<sup>1</sup>Department of Neurofarba, Section of Pharmacology and Toxicology, University of Florence, Viale Pieraccini 6, 50139 Florence, Italy

<sup>2</sup>SIOMI Research Unit, Via Orti Oricellari 26, 50123 Florence, Italy

<sup>3</sup>Department of Chemistry, University of Florence, Via della Lastruccia, 3, 50019 Sesto Eno, Florence, Italy

Bigagli E et al., *Homeopathy*, 2014, 103: 127-132



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## Experimental pattern and results

- ✓ Treated RWPE-1 cells were exposed to 1:100 water-diluted *Apis mellifica* Mother Tincture and its 3c, 5c, 7c dynamized dilutions (30% ethanol) for 24 h.
- ✓ Gene clusters emerged with opposite profiles in cells treated with the *Apis mellifica* Mother Tincture or with 3c, 5c and 7c solutions.
- ✓ Again this behavior strongly suggests that hormetic mechanisms are operative and that substances at homeopathic dilutions may have biological effects

Bigagli E et al., *Homeopathy*, 2014, 103: 127-132



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## REVIEW

## Hormetic effects of extremely diluted solutions on gene expression



Andrea Dei<sup>1,\*</sup> and Simonetta Bernardini<sup>2</sup>

<sup>1</sup>Department of Chemistry, INSTM Research Unit, University of Florence, Via della Lastruccia, 3, 50019 Sesto Eno, Florence, Italy

<sup>2</sup>Società Italiana di Omeopatia e Medicina Integrata (SIOMI), Research Unit, Via Orti Oricellari 26, 50123 Florence, Italy

The use of molecular biological tools, such as DNA-microarrays, can provide useful suggestions about the behavior of human organisms once treated with different microamounts of drugs or homeopathic remedies.



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## Experimental pattern and results

- ✓ Treated RWPE-1 cells were exposed for 24 h to copper(II) sulfate at concentrations varying from  $10^{-6}$  to  $10^{-17}$ M, while untreated reference cells were exposed to the same volume of water.
- ✓ The most interesting result was observed in a cluster of genes with opposite behavior at high and low Cu concentrations, suggesting that hormetic mechanisms were operative.
- ✓ Reverse-transcription-PCR (RT-PCR) analysis was performed on 5 biological replicates for each Cu concentration tested; the results were consistent with those obtained with the microarray.

Dei A & Bernardini S, *Homeopathy*, 2015, 104: 116-122



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**Homeopathic *Rhus toxicodendron* Induces Cell Adhesions in the Mouse Pre-osteoblast Cell Line MC3T3-e1**

Young Soo Oh<sup>1,\*</sup>, Soo Chul Chae<sup>2,†</sup>, Hwan Kim<sup>3</sup>, Hun Ji Yang<sup>4</sup>, Kyung Jin Lee<sup>4</sup>, Myeong Gu Yeo<sup>5,6</sup>

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<sup>3</sup>Center for Research in Medical Biotechnology Laboratory, Gwangju Institute of Science and Technology, Gwangju, Republic of Korea  
<sup>4</sup>Department of Convergence Medicine, Asia Institute for Life Sciences, University of Ulsan College of Medicine, Asan Medical Center, Songpa-gu, Seoul, Republic of Korea  
<sup>5</sup>Address for correspondence: Myeong Gu Yeo, PhD, Department of Integrative Medical Sciences, Nambu University, 23 Chonnam-daero-gil, Gwangju, Gwangju 62271, Republic of Korea (e-mail: myg11@nambu.ac.kr)  
<sup>6</sup>Kyung Ju Lee, PhD, Department of Convergence Medical Institute for Life Sciences, University of Ulsan College of Medicine, Asan Medical Center, 88 Cheongam-ro 43-gil, Songpa-gu, Seoul 05150, Republic of Korea (e-mail: kyeonbanc@ul.ac.kr)

Homeopathy 2021;110:108-114.

**scientific reports**

**OPEN** Low-dose *Drosera rotundifolia* induces gene expression changes in 16HBE human bronchial epithelial cells

Fabio Arruda-Silva<sup>1</sup>, Paolo Bellavite & Marta Marzotto

Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

**Heliyon**

Journal homepage: [www.cell.com/heliyon](https://www.cell.com/heliyon)

Research article

Micro-nano particulate compositions of Hypericum perforatum L. in ultra high diluted succussed solution medicinal products

Dimitris Kallianitas<sup>a</sup>, Meletia Kallianita<sup>a</sup>, Konstantinos Kordatos<sup>a</sup>, Chaido Stefania Karagianni<sup>a,\*</sup>

<sup>a</sup>Department of Materials Science and Engineering, School of Chemical Engineering, NTUA, GR-15701 Athens, Greece  
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<sup>c</sup>Department of Chemical Sciences, School of Chemical Engineering, NTUA, GR-15701 Athens, Greece

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**Review**

**Exploring Possible Mechanisms of Hormesis and Homeopathy in the Light of Nanopharmacology and Ultra-High Dilutions**

Dana Ullman<sup>1</sup>

**Dose-Response:**  
An International Journal  
April-June 2021: 1-13  
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DOI: 10.1177/15593258211022983  
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**SAGE**

Ullman D, Dose-Response, 2021, 1-13

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**Conclusion**

- ✓ The action of drugs is not quenched by ultra-high dilution and proceeds through modulation of gene expression.
- ✓ The different gene expression profiles of cell systems treated with the same drugs at different dilutions suggest the existence of hormetic mechanisms.
- ✓ Microdose pharmacology could become a conceptual revolution of extraordinary importance for future medical developments.

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**Thank for your attention!**



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