



# Decoding Homoeopathy: Nanoparticle Evidence and its Therapeutic Implications

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## Mini Review

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## Abstract

Potentization subsists as a pharmacological procedure, interior to solid whacks which cast-off progressively insipid a drug. Potentization persist as a structure used by homoeopathy, which turned of practicing for 200 years, to sort its medications. The unique measureable is transformed to nanoparticles throughout the process, which might be transferal the "encrypted information" of innovative substantial and devour the organic consequence. Even at high dilutions greater than Avogadro's number, homoeopathic medications contain nanoparticles, according to recent research that used by advanced microscopy and spectroscopy. This research challenges accepted the wisdom of potency and the medicinal drugs. The National Nanotechnology Initiative claims the biological activity can be observed in nanoparticles as miniature of esoteric slew nanometres. The perception of homoeopathic remedies could be regarded as Nano medicines aligns with this endeavour. These nanoparticles have anti-inflammatory, immunomodulatory, and enhanced bioavailability characteristics. They possess the ability to influence immunological and cellular reactions. Throughout the potentization process the drug's bioactivity increases as identical result of reduction in particle size. This supports the theory, by using the principles of quantum mechanics, even highly diluted treatments demonstrate biological efficacy. Research has partaken the homoeopathic medications preserve the architectures of nanoparticles that impact the biological systems. This conclusion imparts the credence to possibility of these remedies may function as Nano carriers, conveying therapeutic information to specific localities privileged as frame. Through the application of these results, homoeopathy is positioned as a sort of Nano pharmacology, therefore bridging the gap between homoeopathic philosophy and contemporary nanoscience.

**Keywords:** Bioavailability; Homoeopathy; Nanotechnology; Nanoparticles; Potentization



## Abbreviations

ICP-AES: Inductively Coupled Plasma Atomic Emission Spectroscopy; TEM: Transmission Electron Microscopy; HRTEM: High Resolution Transmission Electron Microscopy; EDS: Energy Dispersive Spectroscopy; NACAS: Nanoparticle-Allostatic Cross-Adaptation Sensitization.

## Introduction

Homeopathy is a reliable pragmatic medical tactic which epochs hindmost the two centuries. The pharmacological technique of potentization is used to manufacture homeopathic medicines. This involves successive dilutions with forceful strokes at each stage of dilution. The original quantity is divided by 10, 100, 1000 etc., at respectively dilution strides. Evidence derivative from the serially diluted commencement of ingredient may be encrypted during the violent strokes of potentization by epitaxy on silicon-rich crystalline nanoparticles contained in the ultimate homeopathic medicine. The degree of dilution may affect the 'size' of the encrypted information on nanoparticles [1]. Since homeopathic remedies have therapeutic benefits, these nanoparticles and the interfacial liquid on their exterior may convey this information to the target, which biological systems can recognize the established interactions between different types of silica and immune system proteins and cells, homeopathy may serve as a model for Nano medicine. Nanoparticles in homeopathic medicines exert biological effects on the body which can cause hormesis, means its an adaptive response which is induced by stimulation at low doses and inhibition at high doses. Hormesis is akin to Arndt Schultz Law which is about nonlinearity between dose and response [2]. Hence, it appears that homoeopathically prepared remedies may also stimulate a similar response, causing a specific response which, ensures that homeostasis is maintained, and counteracts illness in a curative manner. Reducing particle size increases surface area. Nanoparticles are Nano-size particles (1-100nanometres diameter) having a large surface area to volume ratio which gives them different properties from those bulk forms of the same material.

Indiscriminate use of pesticides and fertilizers causes environmental pollution, emergence of agricultural pests and pathogens, and loss of biodiversity. Nanotechnology, by virtue of nanomaterial related properties, has potential agro-biotechnological applications for alleviation of these problems. Enzyme immobilization using nanomaterials involves the high value low volume application of enzymes. Usually, large enzyme volumes are required for biocontrol in agricultural fields. which can be done if spray applications combined high volume with low value [3]. Cost-effectiveness of such biocontrol preparations can be achieved by immobilization of enzyme on nanostructures, providing

large surface areas, to increase the effective concentration of the preparation. There are studies which focus on nanomaterial-based technologies and their existing and potential applications in plant protection and nutrition.

## Nano-Perspective

According to the National Nanotechnology Initiative, interpretation of substance that consumes at slightest one element which amid tones of nanometres in dimension. Particles that are smaller than a nanometres are the subject of nanotechnology. The manipulation of staple at the atomic, molecular, and supramolecular scales is recognized as nanotechnology [1]. Although it is theoretically impossible for homoeopathic medicines manufactured at such high dilutions to contain even a single molecule of the original drug, it has been observed that these extremely Potentized homoeopathic medicines have perceptible biological effects [2]. New-fangled technologies such as energy dispersive spectroscopy, Inductively Coupled Plasma Atomic Emission Spectroscopy (ICP-AES), electron diffraction, and Transmission Electron Microscopy (TEM) devise the possibility to detect the presence of physical entities in homoeopathic higher dilutions.

These entities receipt the formula of starting metal nanoparticles and their aggregates. [3] Avogadro's number is exceeded by all except 6c in a research that evaluated high dilutions of the homeopathic medication Ferrum Metallicum (Ferr) 6x, 30, 200, 1M, 10Mc, and 50Mc. It was demonstrated conclusively by high resolution transmission electron microscopy (HRTEM) and energy dispersive spectroscopy (EDS) all-inclusive deliberate high dilutions of Ferrum contained a large number of nanoparticles (NPs) with sizes within the range of quantum dots, with the exception of 50Mc, where larger particles (12.61nm) were found. Iron was present in nanoparticles in a variety of weight percentages; HDs, 10Mc, and 50Mc had the highest weight percentage of iron [4].

## Superavogadro Dilutions

A substance's atomic mass is represented by the number of grams in one mole, which is equal to  $6.02254 \times 10^{23}$  molecules. Concentrations in conventional medicine often range from micro molar ( $10 \pm 6M$ ), which is comparable to 6X/3C, to Nano molar ( $10^{-9}M$ ), and equivalent to 9X/4.5C in homeopathy. The concentration of active medicinal ingredient in water ethanol solution decreases to 1/10 and 1/100 of the original concentration, respectively, on the decimal and centesimal scales of dilution. The number of molecules theoretically decreases to 6.022 at 23X and to 0.6022 at 24X. The number of molecules hypothetically decreases to 60.22 at 11C and to 0.6022 at 12C. 12C contains  $10^{-24}$  mol/L, or

0.6022 molecules/L, or one molecule/litre, in units of moles per litre. Certain cell processes can be activated by a single molecule alone, either by preliminary a chain response or controlling solitary in progress [5]. It is incredibly dubious, but unbearable, to identify one molecule of n molecules of original chemical at potencies of 24X/12C and advanced. For a homeopathic solution, the Avogadro's limit (10<sup>-23</sup>M) is 23X/11C/LM4, concentrations (molecules) of the therapeutic source material and nanoparticles are present in potencies up to 23X/11C/LM4. Pharmacologically active substances in quantifiable amounts have a distinct, objective impact on the human body [6].

### Modus Operandi of Homoeopathy

Herbs and minerals comprehending nanoparticles able to delight the infections because of increased bioavailability, anti-inflammatory, antioxidant, and immunomodulatory properties, [7]. The Nanoparticle-Allostatic Cross-Adaptation Sensitization (NPCAS) Model is restrained by homoeopathic medicines in an assortment of dynamic undersized and abiding ways. Reversing the inclination of defective reactivity to environmental stressors, minimal remedy nanoparticles work as novel mild stressors corresponding to the organism's malfunction and flinch time-dependent cross-sensitization [8]. An insignificant relevant stressor is aimed at the physique as an appropriate homoeopathic cure [9]. Homoeopathy deliberates the appliance of homoeopathic treatment nevertheless the homoeopathic aggravation is a component of recuse, resilient fortuitous of recovery. Aphorisms 28, 29, and 148 of the Organon of Medicine by Hahnemann afford a supremely offing explanation of usage process by homoeopathic remedy, merely to provide an intellectual interpretation of the episode.

The patient has an inconsequential and perceptible upsurge of existing warning signs after receiving the homoeopathic medicine that is most similar for their condition, but they still improve and they feel better overall. This transpires the therapeutic sickness, which is fashioned by the same similitum after administration and mutually trace the identical section of afflicted organism, reside in the base of the natural disease. The contrived medical sickness, which is slightly stronger, similar, and affects the organism on its dynamic plane, is currently surpassing the usual ailment. The Hahnemann in aphorism 26 clearly rationalizes the phenomenon by stating "In a living organism, a stronger dynamic affection can permanently extinguish a weaker one if the latter's manifestations are strikingly similar to the former's, despite their differences in kind." The term "aggravation" refers to a rise in the severity or extent of suffering. When nothing abnormal has happened to the mental or physical regimen, every symptom flare-up or the emergence of new ones always indicates that the prescribed

medication—either the remedy itself, its potency, or its dosage—is inappropriate [10].

### Silicate

The crystalline nanoparticles are epitaxial a top silicone-rich preparatory measureable encrypt information during the succession process, resulting in homoeopathic medicine that is formed. Depending on the degree of dilution the amount of information encrypted on nanoparticles changes. As a result, homoeopathy can oblige as a system archetypal for Nano medicine [11]. During the homoeopathic medication production process, surface adsorbed elements from the container surface alter the bio reactivity of silica nanoparticles, possibly carrying the fingerprint of the source material and potentially amplifying the information of the original source into larger potencies. According to a study, plant source materials particle size drops into the nanoscale region, while increasing the number of successions [12].

### Potentization

According to the equation  $E=MC^2$ , which states that energy cannot be created or destroyed but can only be transformed from one form to another, homoeopathic medicines dilute and Potentized mechanical energy (in trituration) or kinetic energy (in succession) and store it as potential energy [10]. The mechanical energy imparted during drug potentization most likely causes the drug aggregates to get smaller [11]. Subsequently, the medication effortlessly crosses the membrane barrier, leading to increased medication action [12]. Crucial Nano bubbles are created throughout the succession process, together with extremely high stresses and temperatures that don't alter the size or form of the metal nanoparticles. The Nanoparticle-Nano bubble complexes that are formed serve as a starting point for the subsequent dilution. As a result, as the succession process progresses, more Nano bubbles will be produced, which will in turn lead to the formation of more Nanoparticle-Nano bubble complexes [13].

These Nano bubbles are distinguished by their, low buoyancy, tremendous energy and lengthy lifespan release upon rupture or collapse. When there is an increased dilution to the extent of the ultra-molecular range, Nano bubbles are linked to superstructures that enlarge [14]. The degree of contact between nanoparticles and CT-DNA varies depending on where they come from, which reflects differences in their individual binding capacities. The varying sizes of the nanoparticles account for variations in their biological function and cellular entrance [13]. Homoeopathic medicine is a type of Nano pharmacology in which the therapeutic material breaks down into nanoparticles during the potentization process. According to a study,

mother tinctures with potencies up to 200C include 1-4000 pictograms/millimetre of nanoparticles (5-100 nanometre size) in homeopathically made plant and metal treatments [14].

### Search for Nanoparticles in Homeopathic Solutions

First suggested in the 1967 French book *Recherché experimental modern homeopathic (Modern Experimental Research in Homeopathy)*, written by Maurice Plazy and Robert Mergerin, was the existence of molecules of the original substance above Avogadro's limit. A group of researchers from the Indian Institute of Technology Bombay (IIT-B) Department of Chemical Engineering conducted research that was published in *Homeopathy (Elsevier)* in 2010 and found that the potency of metal-derived homeopathic medicines was 1-4000 pictograms/millilitre of fine nanoparticles (5-15 Nano meter size) of the original starting material (one molar concentration) in 200c (dilution of 1 part in 10 raised to 400 parts) [15]. This study demonstrated that the amount of nanoparticles detected may be measured using atomic spectroscopy, electron diffraction, and transmission electron microscopy. diffraction and atomic spectroscopy it is possible to measure the quantity of nanoparticles found in homeopathic medicines which retain their potency even when diluted to a nanometre or one-billionth of a metre [16].

### Do Homeopathic Medicines Qualify as Nanomedicines

The fact that a patient's dose of homeopathic medicine may contain few (or none) molecules or atoms of the beginning ingredient does not, by itself, turn homeopathic medications into a class of Nano medicines. Comparing homeopathic and Nano medicines, 12 Toumey.12 made the distinction between the two, citing the example of Aurimune as an example. The primary distinction between homeopathic and Nano medicines is the use of a known quantity of medication in the former situation. Furthermore, with Aurimune Nano medicine, gold nanoparticles serve as the active agent's messengers to the target. Crystalline silica, or silicon, nanoparticles with interfacial water on their surface, together with other trace elements evaporating from the vial's glass wall, may be used in the case of homeopathic medications. One could argue that the important factor in this case is the potential encrypted information's "size," possibly in conjunction with the beginning substance's electromagnetic signature [17]. Given that different potencies of homeopathic medicines have varying effects and qualities, this "size" may be related to the degree of dilution of the drug. Moreover, silicon, or silica, nanoparticles may potentially function as information carriers.

These Nano carriers have the potential to transmit starting-substance information, which biological systems can recognize, to the destination that the starting-substance molecules cannot reach by themselves. However, as homeopathy is considered a holistic medicine and is thought to function through the immune system, the aim is unlikely to be local [18]. Not to mention, different types of silica are known to interact with proteins and cells of the immune system. Homeopathic remedies may be considered Nano medicines since they may contain both the carriers required to deliver the information - which biological systems can recognize - to the target and the 'size' of the information of the diluted away beginning component. Therefore, in comparison to controls, the kind, makeup, and surface characteristics of the crystalline substance (as well as interfacial water) found in homeopathic remedies are crucial. These need to be looked at more thoroughly while also keeping an eye out for potential electromagnetic emission. Appropriate advancements in the domains of materials and interfacial water are necessary for this inquiry [19].

### Variant Potency, Variant Effects

Through direct local ligand receptor interactions at very low potencies, homeopathic medicines function as enhanced micro and Nano scale forms of their source material. At higher potencies, systemic adaptive networks produce dynamical effects via nanoparticles based on electromagnetic, thermal, biochemical, optical, and quantum mechanical properties. Therefore, it can be concluded that the dilution procedure used in the manufacturing of homeopathic medication modifies the sizes, shapes, and surface charges of nanoparticles, leading to variations in their physiochemical properties and biological consequences [20]. The law of quantum mechanics is obeyed by extremely high potencies (beyond sub-nanoscale or below nanoscale) in homeopathic medicine that has been ultra-diluted and contains nanoparticles [21]. According to a study, the amount of medication needed is drastically decreased when it is in the form of nanoparticles, which comply the principles of Homeopathy [22].

### Nanopharmacology

In actuality, homeopathy is a type of Nano pharmacology, in which medicine is made by a certain pharmacological process called potentization or trituration. Pulverization in a grinding machine is the method used for trituration, which involves repeated grinding with lactose powder. As a result, the medication breaks down into nanoparticles [23]. Nanoparticles has a biological activity. Whereas, Homeopathic remedies contain nanoparticles that have biological effects on the body. Hormesis can be brought on by nanoparticles. An adaptive reaction known as hormesis is brought on by



low- and high-dose stimulation and inhibition, respectively. Hormesis is similar to the nonlinearity between dosage and reaction found in Arndt Schultz Law. Therefore, it would seem that homeopathically formulated treatments may also elicit a comparable response, resulting in a particular hormesis that, in turn, guarantees the maintenance of homeostasis and thereby combats illness in a curative manner [24].

## Conclusion

Homeopathic medicine is a type of Nano pharmacology in which the therapeutic material breaks down into nanoparticles during the potentization process. [25]. Ultra-diluted homeopathic medications exhibit nanoparticle-like characteristics, such as enhanced bioavailability, increased reactivity, adsorptive capacity, and quantum, electromagnetic, mechanical, optical, thermal, and biological properties that lead to adaptive changes in homeopathy. In addition to recommending the ingestion of Nano grams of medication, Samuel Hahnemann also provided instructions on how to prepare them [26].

As a result of current research, it is now possible to say that mother tinctures up to 200c potencies of homeopathically made plant and metal treatments include 1-4000 pictograms/millilitre of nanoparticles (5-100 nanometre size). When it comes to homeopathic medicine, less really is more [27]. Therefore, one piece of evidence supporting the homeopathic medication action's Nano pharmacological character is the existence of nanoparticles. There is now less of a divide between homeopathic philosophy and modern science because to these technological evidences.

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