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Review Article

Epigenetics, Nano-Pharmacology and Homoeopathic Perspective

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A B S T R A C T

Homoeopathy has been curing people for years and also the world's second largest and growing medicinal system(according to WHO); but it is still facing criticism for its process of potentization and Placebo effect. Through these existing epigenetic studies and Nano-pharmacology researches; we might have enough proof that can explain effect of potentization and also Homoeopathy is never just a placebo effect. Only a few pieces of evidence are present here otherwise there are many research and studies are concluded or ongoing all over the world. These research studies show the presence of Nano-particles with silicon structure in highly diluted Potentized medicine (beyond Avogadro's number) and also explained after being highly diluted, still shows efficient effects to change the gene expressions. Here, references are taken from PubMed, Google scholar, IJRH and others.

Keywords: Homeopathy Potentization, Nanoparticles, Nanopharmacology, Epigenetics

Introduction

Dr. Samuel Hahnemann has given us a new system of medicine, homoeopathy. It is founded on a definite law, 'Similia Similibus Curentur,' which means '"Let like be cured by like' which means 'like cures like'. Homoeopathy includes a crucial element known as Potentiation. Due to a lack of evidence and insufficient research, homoeopathy has faced many backlashes; one of them is the placebo effect and criticism of the process of potentiation. But in the modern era with the developed technology and adequate equipment, we have certain trustworthy scientific evidence and research results.

Nano-pharmacology & Homoeopathy

Nano-pharmacology is the application of nanotechnology in pharmaceuticals, utilizing nanoparticles and nanomaterials (1-100 nm) to enhance drug delivery, improve bioavailability, and enable targeted therapy. E.g., in tumors, nanoparticles made from medicinal molecules and polymers, with a layer of ligands (so they only affect targeted cells), are injected into tumor patients via the bloodstream; they reach the tumor cells and lead to apoptosis.

In modern medicine, the use of nanoparticles in drug delivery has opened new avenues for treating cancer, cardiovascular diseases, skin diseases, and more. These nanoparticles have benefits of better disease targeting, the ability to cross the membrane & enter the cell, a longer duration of drug action, cost savings from lower doses & reduced side effects.

In homoeopathy via potentization, somehow, we are dealing with the same nanoparticles & their benefits. Potentization is a two-step process—serial dilution and vigorous shaking (succussion) or grinding (trituration)—used to prepare

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remedies by reducing toxicity while supposedly enhancing curative, "dynamic" properties.

Some researches on the diluted Potentized homoeopathic medicine & their certain results:

- Based on the research article of Jayesh bellare et al.[1] using state-of-the-art techniques (TEM, SAED, and ICP-AES); there is presence of nanoparticles and their aggregates of the starting medicinal substance of Ultra-diluted potentized homoeopathic medicine.
- Another research article of Rajendra Upadhyay et al.[2] by the TEA(Trace element analysis); Potentized Homoeopathic medicine's nanoparticles were rich in silicon and had crystalline nature. During the stroke of potentization, the arising information of starting medicinal substance might be encrypted by epitaxy on silicon -rich crystalline. That may occur for able to identify and reach the target for cure. As various forms of silica are known to interact with proteins and cells of the immune system, For the further confirmation research is necessary.
- By the Nanoparticles-allostatic cross adaptation sensitization model of Iris R Bell et al.[3] as shown in Figure 1 we might be able to understand how homoeopathy medicine works with this nanoparticles so according to this model in healthy organism allostatic overload of cumulative high level stressors takes place, they create long-lasting disturbance in balance of the body of the healthy and also with for a long duration they increase body sensitivity which leads to sickness. This allostatic overload of cumulative high level stressors include Environment stressors like work-stress, social isolation, etc. ; Physiological stressors like inadequate sleep, low dietary quality, etc. and also, trauma or major life events, like abuse, death, etc. With nanoparticles (homoeopathic medicinal) acts as a low, similar stress signal on sick which triggers without harm via hormesis and time-dependent sensitization(intermittent doses), the human body as a whole reacts by improving its natural defense and healing responses, regulate the body, body became more resilient(improved at handling stress, disease, etc.)& improve completely & cure takes place as whole as shown in Figure 2.

The above research is living proof that highly diluted potentized medicine (beyond Avogadro's number) is the presence of curing material and power.

Epigenetic & Homoeopathy

Epigenetics is the study of how behaviors and environmental factors (like diet, stress, and toxins) cause changes that affect how genes work without altering the underlying DNA sequence.

Homeogenomics[4] refers to studies that focus on understanding more about the interactions between homoeopathic remedies and the genetic blueprint of the genome. It also refers to investigations designed to reveal epigenetic modifications that are associated with rearrangement of the expression of targeted genes.

Over the years many experimental research studies have been done on the effects of homoeopathic medicine on the expression of genes.

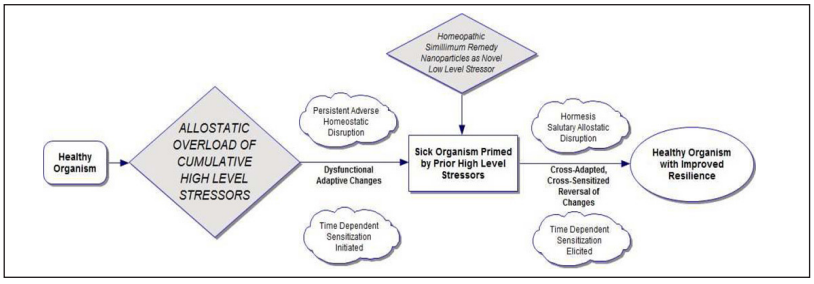


Figure 1.Proposed Mechanistic Framework Linking Homeopathic Similimum, Stress Adaptation, Allostatic Overload, and Enhanced Resilience

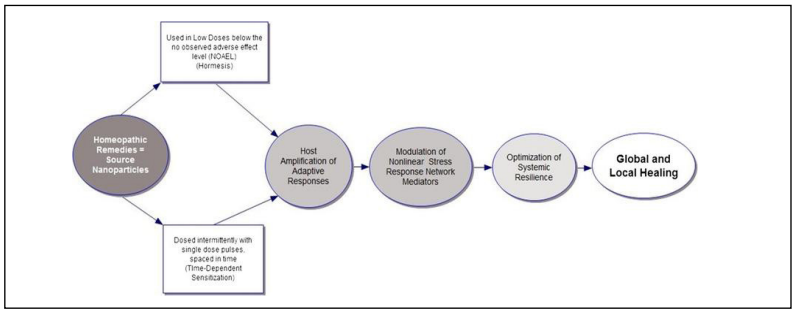


Figure 2.Proposed Mechanistic Pathway of Homeopathic Remedy–Induced Stress Modulation and Systemic Resilience

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Table 1.Evidence from Experimental Studies on the Molecular, Epigenetic, and Apoptotic Effects of Homeopathic Remedies

Study	Models	Remedy (With used form/ Potency)	Results(Which Includes Molecular targets, Epigenetic effects and Outcome)	References
In vitro studies (On living cell lines)	On the Dalton's lymphoma ascites tumor cells	Ruta 200C & Carcinosinum 200C	Ruta 200C produced morphological changes and induced DNA laddering(a hallmark of apoptosis). Carcinosinum 200C increased apoptotic gene p53(protein-tumor suppressor gene)and Ruta 200C decreased anti-apoptotic gene Bcl2.(survival promoting protein)	Korengath Preethi et al[7]
	On skin Melanoma cells (A375 cells)	Ethanolic Phytolacca decandra	Ethanolic Phytolacca decandra caused a reduction in proliferation of A375 cells; generation of ROS (Reactive oxygen species-stress molecules-helps in apoptosis)and DNA damage, It also Down-regulation of Akt and Bcl-2(survival promoting protein), up-regulation of p53(protein-tumor suppressor gene),Bax and caspase3(cell death promoting factors); which made the cancer cells prone to apoptosis.	Ghosh S. et al.[5]
	On Cervical cancer cell lines (HeLa)	Condurango extracts	Condurango extract's effect; caused increase in the HeLa cell population containing DNA damage at the G0/G1 Stage. Further It increased the tumor necrosis factors TNF-alpha and FasR, It also triggered a sharp decrease in the expression of nuclear factor NF-kb(survival promoting protein-genes)both at the DNA and the protein levels, a possible route to attenuation of Bcl-2 and caused an opening of MTP(membrane's permeability transition) pores, thus enhancing caspase activities. It was found to be cytotoxic(cell-killing)against target cells, and this was significantly deactivated in the presence of NAC(antioxidant that helps in cell survival), a scavenger of ROS.	Khuda-Bukhsh et al.[6]
In vivo studies (On Animal models)	Tumor-bearing mice	Ruta 200C & Carcinosinum 200C	Administration of potentiated homoeopathic drugs to tumor-bearing mice induced TUNEL-positive cells(cells with damaged/fragmented DNA)in the tumor, showing increased apoptosis of tumor cells	Korengath Preethi et al[7]
DNA Methylation (Gene silencing -off)	Lung Cancer of Rats	Condurango 30C	Condurango 30C effects on p15 (protein acts on DNA; stops cell cycle)& p53(protein acts on DNA; repair or leads to apoptosis);and it could trigger epigenetic modification in lung cancer via modulation of DNA hypermethylation(prevents gene expression).	Khuda-Bukhsh et al[8]

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Others	On the KATO-III (gastric adeno carcinoma cell lines);	Nux vomica	Nux vomica 10c and Calendula officinalis 10c in a 43% ethanolic solution led to a significant reduction of H. pylori induced increase in gene expression of HB-EGF(Heparin-binding epidermal growth factor-protein); respectively. Nux vomica 12c reduced HB-EGF gene expression even in dilutions beyond Avogadro's number. Nux vomica 12c in a 21.5% ethanol showed a smaller effect . This effect was only be observed when the drugs were primarily prepared in ethanol, not in aqueous solutions. The data suggest that both drugs prepared in ethanolic solution are potent inhibitors of H. pylori induced gene expression.	Roland Hofbauer et al[9]

The above studies (Table 1) show that homoeopathic medicine works on cells and creates epigenetic effects by modification of proteins, genes, factors, etc., which leads to change in gene expression.

This study also proves that homoeopathic medicine works on deep levels, so it's just not the placebo effect.

Epigenetic , Nano-pharmacology and Homoeopathy/Conclusion

Potentiation criticism and the placebo effect are baseless accusations of homoeopathy; the presence of nanoparticles and changes in gene expression verify that. It's also indicated that while modern medicine has been using nanopharmacology for several decades, we have been using it in homoeopathy for almost two centuries, and we are showing results on the deeper depths, like genetics, with efficiency. Further studies are required for how nanoparticles reach the target and cure patients as a whole.

Discussion

Homoeopathy has always been a scientific system of medicine. Nanoparticle studies also suggest that homoeopathy may be a futuristic field with the potential to address even highly advanced pathological conditions. Genetic studies have also suggested that homoeopathy may influence genetic and inherited factors, potentially contributing to the survival and recovery of a child. However, to establish these claims scientifically, homoeopathy needs more research, clinical studies, experiments, and evidence-based experience.

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