**Hypothesis Article**

# Pharmacological Basis of Similia Similibus Curantur

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## ABSTRACT

***Introduction*:** Similia Similibus Curantur is the main principle followed in homoeopathy, which means if a drug can produce symptoms in healthy individuals, the same drug will relieve similar symptoms of the disease. The biological, pharmacological, and toxicological action of capsaicin alkaloids is a perfect example to explain the Similia Similibus Curantur principle. Most of the drugs in homoeopathic Materia medica contain toxicological, pharmacological, drug-proving, and traditional use-related symptoms and indications. The abnormal sensations and symptoms of the disease are caused by the involvement of a specific receptor or molecular pathway and gene functions. ***Principle*:** These receptors or molecules may be stimulated or suppressed by environmental, natural, or artificial agents. Specific homoeopathic medicines with similar affinity for the specific receptors or molecules involved in the disease process result in receptor or molecular pathway modulation (e.g., desensitization, sensitization, inhibition) in these cases. These kinds of actions cause the improvement of symptoms or curative effects. So Similia similibus curanter can be understood as "a similar receptor or molecular pathway involved in both drug molecules' biological, pharmacological, and toxicological action and disease pathogenesis." The selection of medicine is made by comparing the similarity between the receptor or molecular pathway in disease pathogenesis and drug pathogenesis. To avoid unwanted aggravations or side effects while using mother tinctures or solutions, administer them at a lower dose than their physiological dose. ***Conclusion*:** The theory of the pharmacological basis of Similia Curantur creates a rational method to apply the Similia Principle. Based on this theory, there is a possibility of discovering novel drugs in the future that act and give a cure in similia similibus curantur way.

**Keywords:** *Similia Curantur, Mode of action, Homeopathic medicine, Receptor and molecular pathway mediated mechanism, Minimum dose, Hypothesis on action of homoeopathic medicine*.

The homeopathic system of medicine is constructed on the principle of "Similia Similibus Curantur". There are two kinds of dilutions or potencies of therapeutic agents used to treat patients. They are dilutions that contain original drug molecules, such as Mother tincture (MT) or mother solutions (MS), 1c to 12c and extremely serially diluted medicines, where original drug molecules are not present, e.g., dilutions above 30c [1-4]. Hahnemann came up with drug testing as a way to find out how drugs cause illness in healthy people [3]. Drugs in mother tincture or solution form have biologically active ingredients used in this technique. Then documentation of the effects of such drugs on healthy humans follows and these records serve as the foundation for the development of homoeopathic materia medica. This Materia medica also contains the toxicological symptoms of that particular drug substance. Such pieces of information are from reliable sources of toxicological records [3, 5, 6].

Patient clinical case data is compared with this Materia medica. Medicines with symptoms identical to the patient's symptoms are selected to treat the patient. It is important to note that homeopathic Materia medica contains symptoms of drug proof, toxicological records, indications related to the clinical experiences of different physicians, and traditional uses [3-7]. There is much controversy around homeopathy about the mode of action of homeopathic medicine. Mother tinctures or mother solutions are diluted

with distilled water or alcohol serially, and then by giving a particular number of agitations, potencies are prepared. The possibility of getting a single molecule of the original drug is reduced when in higher dilution, such as at potencies above 12c potencies (e.g., 30c = 10-60) [3, 4, 5, 6].

**AIM**

In this article, we discussed the pharmacological basis for the action of homeopathic medicine and its applicability (Figure 1) based on the Similia Similibus Curantur.

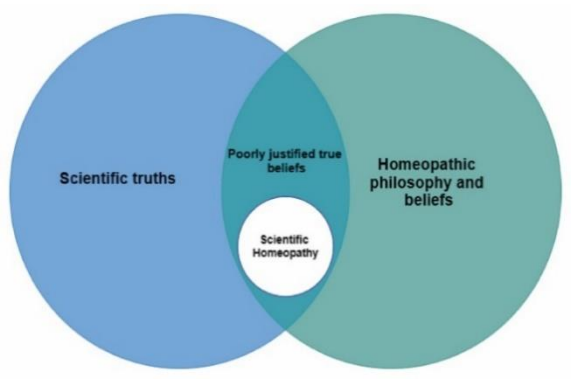


**Figure 1: Pharmacological foundation of homeopathic medicine and its usefulness**

**THE NEW THEORY TO EXPLAIN SIMILIA SIMILIBUS CURANTUR**

Similia Similibus Curantur is also called the law of similar. This means that a drug that can cause harmful symptoms in healthy people will also relieve disease-related symptoms. Abnormal sensations and symptoms of the disease are caused by stimulation or involvement of a specific receptor or molecular pathway and gene functions, these receptors or molecules may be stimulated or suppressed by environmental, natural, or artificial agents. In such cases, administration of specific homoeopathic medicines with a similar affinity for the specific receptors or molecules involved in the disease process results in modulation of such receptor or molecular pathways (e.g., desensitization, sensitization, inhibition). These kinds of actions cause the improvement of symptoms or curative effects (Figure 2). This kind of receptor- or molecular-based activity of homeopathic medicines is caused by the presence of biologically or pharmacologically active substances in those medicines and by their concentrations. The dynamic theory of Modus Operandi (mode of action) of homeopathic medicine proposed by Hahnemann is similar to that of receptor pathway or molecular pathway mediated mechanisms. Example: The activity of capsaicin on transient receptor potential channels of the vanilloid subtype 1 receptor (TRPV1) is identical to the theory of the primary action of the medicine (Phase I) upon the vital force [8]. The reactions that happen after the activation of the TRPV1 receptor are similar to the secondary curative action (Phase II) in homeopathy [8] (Figure 2).

This is the action of a vital force against the medicinal action. The biological/ pharmacological, and toxicological action of capsaicin alkaloids is the perfect example to explain this phenomenon [3, 7].

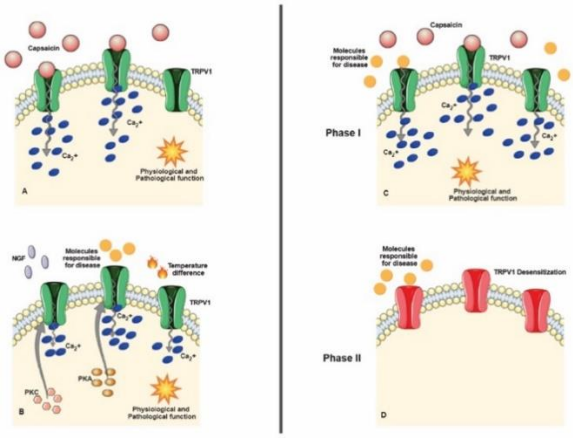


**Figure 2: Mode of action of homeopathic medicine.**

***Transient receptor potential channels of the vanilloid subtype 1***

In mammals, the transient receptor potential channels of the vanilloid subtype 1 (TRPV1) receptor are distributed throughout the body, especially in the unmyelinated C-type sensory nerve fibers, the less myelinated Aδ type of sensory nerve fiber, the peripheral nervous system, the dorsal root ganglion, the trigeminal ganglion, the vagal ganglion, the thalamus, the striatum amygdale, other regions of the central nervous system, the pancreas, liver, lung, heart, GI organs, the oral cavity, and smooth muscles of the human body [9]. TRPV1 receptors get activated or sensitized directly or indirectly by different physical, chemical factors, inflammatory mediators, e.g., mechanical stimulation, ethanol, inflammatory mediators, tissue damage, noxious heat stimulation that is > 43◦C, acid pH less than 5.3, intracellular redox state, changes in extracellular osmotic pressure, substance P (SP), prostaglandins, and nerve growth factor (NGF) [10].

Stimulation of TRPV1 leads to an influx of extracellular Ca2+, increased intracellular calcium level causes depolarization of nerve cells to produce an action potential. There is a transmission of an action potential along the sensory nerve fibers of the nerve center or activation of a

series of signaling pathways in the cells, which triggers a wide range of cellular responses. Activation of TRPV1 in sensory nerve fibers causes the release of neuropeptides from the local vesicles, and there is the formation of an independent action potential that causes increased terminal calcium in the nerve cells. Through these mechanisms, TRPV1 receptors regulate the corresponding physiological and pathological functions [9].

***Interaction of Capsaicin TRPV1 receptor***

Capsaicin can stimulate the TRPV1 receptor. It leads to the excitation of TRPV1, followed by the release of neuropeptides. It depends on the capsaicin concentration. Generally, the capsaicin molecule's action on the TRPV1 receptor produces pain sensations like burning and heat [9]. The purified capsaicin also has analgesic properties [11, 12]. TRPV1 controls gastric acid secretion. A small dose of capsaicin activates the primary nociceptive neurons, leading to the release of a large amount of calcitonin generated peptides (CGRPs). This CGRP inhibits irritation caused by gastric acid and pepsin secretion. In one study, rats were given capsaicin orally and developed acute erosive gastritis [13]. This inflammatory effect is due to the action of a large amount of capsaicin [9]. In homeopathy, gastritis and its associated symptoms are produced by capsicum annum in drug proving and recorded under the respective drug in the homeopathic Materia medica [7].

TRPV1 stimulation increases blood flow to the stomach, which stops the stomach from making acid and makes the gastric mucosa make prostaglandins and epidermal growth factors. Through this mechanism, it helps in the healing of gastric ulcers [14]. A study on functional dyspepsia found that taking capsicum via capsule increased dyspeptic symptom scores. This study indicates the involvement of the capsaicin receptor channel in functional dyspepsia. The dyspeptic score increased because of the increased visceral sensitivity caused by increased stimulation of TRPV1 [15]. The capsaicin molecule has a higher level of affinity towards the compounds containing substance P (SP) present on the membrane of sensory nerve terminals. Calcitonin gene-related peptide (CGRP) is an inflammatory, pain-inducing afferent neurotransmitter found in capsaicin-sensitive afferent nerve fibers [9]. Drug proving data in homeopathy contains records of dyspeptic symptoms caused by the ingestion of capsicum mother tincture in significant quantity for several days in healthy drug-proving subjects [7,16].

In a randomised controlled clinical trial, capsaicin consumption by IBS patients resulted in desensitization; chili, equivalent to 2 mg of capsaicin consumed daily for six weeks, reduced bloating and abdominal pain when compared to a placebo [17]. TRPV1-activated airway inflammation is a neurogenic inflammation that causes bronchial epithelial cells to release pro-inflammatory cytokines such as tumor necrosis factor alpha (TNF-), prostaglandin E2, interleukins, and nerve growth factors (NGF). Coughing and hyperresponsiveness of the airways, bronchoconstriction, tracheal mucosal oedema, inflammatory cell chemotaxis, and mucous secretions are also associated with TRPV1 hyperregulation [18].

Stimulation of the TRPV1 receptor in the nasal cavity leads to TRPV channel hyperresponsiveness, and stimulation of afferent nerve fibers causes increased glandular secretion, vasodilatation, and increased vascular permeability, like in the symptoms of chronic rhinitis. Continued capsaicin stimulation leads to a decrease in mucosal permeability, and hyposensitivity of sensory neurons in the nasal cavity. So, these cells become less hyper-reactive, and through this mechanism, neurogenic pain gets reduced. Here, SP store depletion leads to desensitization caused by the depletion of phosphatidylinositol 4, 5 -bisphosphate (PIP2) [13].

***Capsicum annum as a medicine in homoeopathy***

In homeopathic Materia medica, we can find the effects of capsaicin through the drug testing of Capsicum annum on healthy human beings. The symptoms produced here are identical to the pharmacological effect of capsaicin. Symptoms of a drug produced during drug trials are similar to its pharmacological records (Table 1). Because of the pharmacologically active ingredient or biologically active ingredient present in that drug, its affinity is towards a particular receptor or molecular pathway, e.g., the interaction of strychnine with the glycine receptor (Table 1). Capsicum annum in homeopathic Materia medica has indications related to gastric ulcers, IBS, airway hyperresponsiveness based on its drug proof [7,16]. Where TRPV1 is involved, patients with IBS, cough, airway hyperresponsiveness, and functional dyspepsia are treated homeopathically with oral administration of capsicum annum in low potency. Followed by the improvement of symptoms due to downregulation, desensitization, or reduction in TRPV1 receptor expression [19]. This may happen when low potency capsicum annum is administered repeatedly [20]

***Some other examples***

In homoeopathy, Aconitum nephalus is given as a medicine for these cardiac arrhythmias and myotonia. Aconitum nephalus contains aconitine as an active principle [21]. It is

both a cardiotoxin and a neurotoxin. It binds with high affinity to the open state of the voltage-sensitive sodium channels at site two, thereby causing persistent activation of the sodium channels, which become refractory to excitation. Through which it produces arrhythmogenic effects and contractions or spasms of muscles. The arrhythmogenic properties of aconitine are in part due to its cholinergic or anticholinergic effects mediated by the vagus nerve [22-24]. This molecular toxicological mechanism is very similar to the pathogenesis of cardiac arrhythmias and myotonia because the same voltage-sensitive sodium channels are involved here. Homeopathy treats those pathological conditions curatively by administering a very small amount of Aconitum nephalus to regulate or modulate the voltage-sensitive sodium channels [20].

Similarly, strychnine and brucine are major poisonous alkaloids of the Nux vomica plant [25]. This Nux vomica plant is successfully used as a medicine in homoeopathy to treat muscular spasms and myoclonic disorders by applying the similia similibus curantur principle [20]. Strychnine alkaloid is a competitive antagonist; a neurotransmitter glycine receptor inhibitory neurotransmitter in the spinal cord, brain stem, and higher centres that causes increased neuronal excitability, which leads to increased muscular activity. Brucine is an allosteric modulator at cloned M(1) muscarinic receptors. Strychnine poisoning can lead to enhanced reflexes, twitching, a stiff neck, and a backache. The involvement of glycine and muscarine receptors in the pathogenesis of muscular spasms and myoclonic disorders is similar to the molecular mechanism of the toxicological action of strychnine and brucine [25-29]. A minute amount of strychnine in the homoeopathic medicine Nux vomica [20] may regulate those receptors based on the phase I and phase II mechanisms of this new theory to produce curative effects in those disease conditions.

Hahnemann used the word dynamic because there were no scientific instruments [6] to understand the biological concepts microscopically. But he traced some patterns of action and reaction by observing the symptoms of drug provers and patients. So, he named it as dynamic action or action of vital force. So Similia similibus curanter can be understood as "similar receptor or molecular pathway involved in both drug molecules biological, pharmacological, and toxicological action and disease pathogenesis" (Table 1).

## MINIMUM DOSE PRINCIPLE OF HOMEOPATHY

Hahnemann advises smallest possible dose itself is sufficient to cure the disease. It can produce the slightest homeopathic aggravation which is similar to the disease symptoms (Aphorisms 281-290, 241-250) [8]. But nowhere Hahnemann defines this smallest possible dose or minimum dose, and this created confusion among homoeopaths. In his early days of medical practice, he used mother tinctures or solutions. Especially mother tinctures from common vegetables are used in large quantities to treat patients. But he found severe aggravation while using mother tinctures/solutions of poisonous plants and chemicals, which compelled him to dilute the medicines to avoid aggravation. Then he follows the Decimal scales and rarely Centesimal and LM Scale Potencies [30,31]. The possibility of getting a single molecule of the original drug is reduced in higher dilution, such as above 12C potencies (e.g., 30C = 10-60) [3-6].

In the homeopathic medical system, three varieties of ratios used to make potentised dilutions such as 1:9, 1:99, and 1: 50,000. Potentization is the process of giving a succussion/agitation (downward stroke) to the serial dilution [4,6,32]. In earlier periods of the homeopathic system, low potencies original drug substances from high levels to traceable levels. Alcoholic extracts of the drugs or solutions made with distilled water called mother solutions used to administer for drug proving [33,34].

In those days, without any scientific instruments or methods, Hahnemann developed dynamic theories of homeopathy on the action of homeopathic medicine, which says homeopathic medicine got dynamic curative power when it diluted [30,31,33]. In the earlier phase of homeopathic history, physicians frequently used low potencies, they carry drug molecules. The` use of ultra-high dilutions such as above 30c is scarce, and its use is experimental [30,33]. Later homeopaths like JT Kent recommended the application of 30c, 200c, 1M patterns of ultra-high dilutions for therapeutic purposes. He arrived at such an idea by comparing the dilutions with Octavia musical notes. His theory related to those potency uses does not have a scientific base. Some believers stick to this concept [30,35,36]. However, actual homeopathy followed all kinds of potencies/dilutions from the mother tincture to ultra-high dilution so far [20,30,31,33].

According to the above-explained receptor-mediated or molecular mediated action principle, the minimum dose is nothing but the least quantity of Therapeutic agent/medicine that stimulates or interacts with the receptor or molecular pathway. Single doses of medicinal substances in reasonable amounts or repeated administration of low potency at frequent intervals can interact with the receptors or molecular pathway. This kind of homeopathic action

happens only if that potency or dilution contains an original drug molecule, at least in a traceable quantity [37].

## USE OF TRADITIONAL MEDICAL KNOWLEDGE IN HOMEOPATHY

Experiments made upon healthy individuals for the purpose of noting the effects of the drug, The sources of homoeopathic materia medica [7] are the effects observed after poisonous doses (accidentally or maliciously administered) and symptoms (cautiously admitted) observed in the sick after drug administration. So, most of the drugs in homeopathic Materia medica contain toxicological/pharmacological, drug-proving, or traditional use related symptoms and indications (Table 2). Therapeutic use of digitalis for cardiac dropsy and skin conditions are all examples of pharmacological prescription [38,39,40], whereas selecting digitalis based on symptoms like tachycardia, atrial fibrillation, ventricular tachycardia, ventricular fibrillation are examples of its homeopathic application [41,42]. Similarly, arnica's use in bruises, sprains, and contusions is based on pharmacological and traditional practises [36, 43]. Homeopathic application in conditions such as skin eruptions, dermatitis, and gastritis are examples of its therapeutic application [41, 42].

Homeopathic materia medica borrows drug information from other systems of medicine, including Indian, Greek, Egyptian, North American native medicine, and Mexican and Brazilian native medicine [42]. For example, to treat different stomach ailments in traditional medicine, Cundurango plant extracts were used [43]. This information is taken under homeopathic Materia medica and used for the same purpose. Pharmacologically, Cundurango has a gastroprotective effect [44,45]. Syzygium jambolana is traditionally used in Ayurveda to treat diabetes mellitus, the same medicinal plant is used in homeopathy for the same purpose [20,46]. This kind of medicine in homeopathic Materia medica does not have complete drug proving symptoms or complete drug proving symptoms along with indications from traditional use. The pharmacological actions of the active principles present in the drug substances are responsible for their curative and palliative actions.

## FLAWS OF HOMEOPATHIC MATERIA MEDICA

Even though Materia medica was constructed based on drug-proving data, it contains numerous adulterations within the symptomatology of drugs, such as proponents' ideography, beliefs, and thoughts [47]. This kind of adulteration happens due to the lack of scientific methodologies used in those times of drug testing, possibly around the 19th and early 20th centuries. They are primarily found in medicine from imponderabilia sources, milk sources, sarcodes (e.g., horns), common vegetables (e.g., cucumber, tomato), and nosodes (due to the use of ultra-high dilutions for drug testing).

Hahnemann contradicts empirical knowledge/traditional knowledge, or mere experience related to medicine used for therapeutic purposes [8]. However, the homoeopathic Materia medica contains a wealth of clinical experience. Some of them have no justifiable scientific scrutiny. Removing adulterant symptoms and un-useful medicine from the Materia medica and adding pharmacologically or biologically active drugs from the plant, animal, microbial, mineral, and synthetic sources into the homeopathic Materia medica can increase the scope of homeopathy [48].

## METHOD OF APPLICATION OF THIS THEORY AND ITS LIMITATION

The selection of medicine is made by comparing the similarity between the receptor or molecular mechanism in disease pathogenesis and drug pathogenesis. To avoid unwanted aggravations or side effects while using mother tinctures or solutions, administer them at a lower dose than their physiological dose based on the patient's age, weight, allergic history, the nature of the medicine, and the nature of the disease. The amount of active ingredient present in the dilution and dilution ratios are helpful to calculate the dosage of the indicated medicine. Potencies of 3x to 30x and 2c to 12c may be appropriate in pediatric levels because these dilutions contain a very small fraction of the drug's active principle. Toxic dose calculations for each drug substance based on toxicological data are helpful to standardise the dosage to an unharmful level.

This theory on the pharmacological basis of homoeopathy is not applicable to potencies prepared from microbial products or tissue products, imponderabilia (sunlight, x-ray), or ultra-high dilutions because they don't have any active principles [5,6,82]. Drugs prepared from common dietary vegetables except spices are not useful based on this theory because they lack pharmacologically active substances. This theory for the action of homoeopathic medicine is workable in adherence to modern pharmacological principles. And it is not applicable to formulate antibiotics, anti-parasitic, or anti-viral drugs, but this theory is most suitable for other kinds of diseases. According to Duck's criteria, the Similis Similibus Curantur principle is not applicable to microbial diseases or diseases where mechanical aid is needed [81].

Nanoparticle theories in homoeopathy try to explain the action of ultra-highly diluted homoeopathic medicine. However, this Nano theory fails to explain the curative action of ultra-high dilutions of organic compounds, and the replicability of these curative results is questionable [82]. Nanoparticle theories related to inorganic homoeopathic drugs also follow molecular-mediated mechanisms, for example, epigenetic modification.

## CONCLUSION

Hahnemann developed the theory of Similia Similibus Curantur. He used philosophy rather than firm scientific methods to explain this theory because of lacunae in the fundamental scientific knowledge of medicine during the seventeenth and early eighteenth centuries. There are immense scientific advancements in modern times. This scientific knowledge can help explain the similarity principle in a better way. The theory of the pharmacological basis of Similia Curantur can serve this purpose and create a rational method to apply this Similia Principle for the betterment of humanity. This theory also creates an opportunity to develop homeopathic medicines that may be administered via other routes than oral ones, such as intravenous or intramuscular routes. And this theory makes homeopathy a sound scientific system rather than a belief system. Based on this theory, there is a possibility of discovering novel drugs in the future that act and give a cure in a similibus curantur way.

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## REFERENCES

1. Hughes Richard. The principles & Practice of Homoeopathy. 8th impression ed. New Delhi: B.Jain Publishers (P) Ltd; 2011.
2. Wijk R, Wiegant FA. Postconditioning hormesis and the similia principle. Front Biosci 2011;3:1128-1138.
3. Attarwala H, Bathija D, Akhil A, et al. Homeopathy-the science of holistic healing: An overview. Pharmacogn mag 2006;2(5):7-4.
4. Chatterjee BK. The mathematics of dilution. Homeopathy. 2014;103(2):143-146.
5. Chirumbolo S. Bias in homeopathy: Technical Note. Malays J Med Biol Res 2017;4(1):25-28.
6. Jonas WB, Kaptchuk TJ, Linde K. A critical overview of homeopathy. Ann Intern Med 2003;138(5):393-399.
7. Timothy F. Allen. The encyclopedia of pure Materia medica: a record of the positive effects of drugs upon the healthy human organism. New York : Boericke & 597 Tafel;1874.
8. Hahnemann CFS. Organon of medicine. 5th & 6th combined reprinted ed. New Delhi:B Jain publishers (P)Ltd ; 2004.
9. Du Q, Liao Q, Chen C, et al. The Role of Transient Receptor Potential Vanilloid 1 in Common Diseases of the Digestive Tract and the Cardiovascular and Respiratory System. Front Physiol. 2019;10:1064.
10. Alawi K, Keeble J. The paradoxical role of the transient receptor potential vanilloid 1 receptor in inflammation. Pharmacol Ther 2010;125(2):181-195.
11. Menéndez L, Lastra A, Hidalgo A, et al. The analgesic effect induced by capsaicin is enhanced in inflammatory states. Life Sci 2004;74(26):3235-3244.
12. O'Neill J, Brock C, Olesen AE, et al. Unravelling the mystery of capsaicin: a tool to understand and treat pain. Pharmacol Rev 2012;64(4):939-971.
13. Istvan Nagy, Dominic Fristorn, João Sousa Valenter, et al. Pharmacology of the Capsaicin Receptor, Transient Receptor Potential Vanilloid Type-1 Ion Channel. in: O. M. E. Abdel-Salam eds. Capsaicin as a Therapeutic Molecule, Progresss in drug research .Newyork: Springer Basel AG ; 2014;68:496 39-76
14. Satyanarayana MN. Capsaicin and gastric ulcers. Crit Rev Food Sci Nutr 2006;46(4):275-328.
15. Hammer J, Führer M, Pipal L, Matiasek J. Hypersensitivity for capsaicin in patients with functional dyspepsia. J Neurogastroenterol Motil 2008;20:125-33.
16. Hahnemann Samuel CF. Materia Medica pura. 1st Translated ed. New York:William Radde; 1846.
17. Aniwan S, Gonlachanvit S. Effects of Chili Treatment on Gastrointestinal and Rectal Sensation in Diarrhea-predominant irritable bowel syndrome: A Randomized, Double-blinded, Crossover Study. J Neurogastroenterol Motil 2014;20(3):400-406.
18. Brozmanova M, Mazurova L, Ru F, et al. Comparison of TRPA1-versus TRPV1-mediated cough in guinea pigs. Eur J Pharmacol 2012;689(1-3):211-218.
19. Cliff MA, Green BG. Sensitization and desensitization to capsaicin and menthol in the oral cavity: interactions and individual differences. Physiol Behav 1996;59(3):487-494.
20. Boericke W. New manual of Homoeopathic Materia medica with Repertoryt. 3rd revised & augmented ed. New Delhi: B Jain publishers (P) Ltd;2000.
21. Biren shah,.Seth A.K. Textbook of Pharmacognosy & Phytochemistry, 1st ed. India: Elsevier;2010.
22. Chan TY. Aconite poisoning. Clin Toxicol (Phila) 2009;47(4):279-285.
23. George AL Jr. Inherited disorders of voltage-gated sodium channels. J Clin Invest 2005;115(8):1990-1999.

24. Angus M, Ruben P. Voltage gated sodium channels in cancer and their potential mechanisms of action. Channels (Austin). 2019;13(1):400-409.
25. Jensen AA, Gharagozloo P, Birdsall NJ, et al. Pharmacological characterisation of strychnine and brucine analogues at glycine and alpha7 nicotinic acetylcholine receptors. Eur J Pharmacol 2006;539(1-2):27-33.
26. Yonkman FF. Effect of Strychnine on the Muscular Activity of the Small Intestine in Unanesthetized Dogs. J Pharmacol Exp Ther 1929;37(3):339-347.
27. Young AB, Snyder SH. Strychnine binding associated with glycine receptors of the central nervous system. Proc Natl Acad Sci U S A 1973;70(10):2832-2836.
28. Aronson J.K. Meyler's Side Effects of Drugs, the international encyclopedia of adverse drug reactions and interactions. 16th ed. Philadelphia: Elsevier B.V; 2016.
29. Gundlach AL. Disorder of the inhibitory glycine receptor: inherited myoclonus in Poll Hereford calves. FASEB J 1990;4(10):2761-2766.
30. Campbell A. The two faces of homoeopathy. Br Homeopath J 1985;74(01):1-0.
31. Sunila ES, Kuttan R, Preethi KC, Kuttan G. Dynamized preparations in cell culture. Evid Based Complement Alternat Med 2009;6(2):257-263.
32. Anick DJ. The octave potencies convention: a mathematical model of dilution and succussion. Homeopathy 2007;96(3):202-208.
33. Hael Richared. Samel Hahnemann his life and work. 11th impression ed. New delhi: B Jain publishers (P) Ltd; 2013.
34. Samadder A, Das S, Das J, et al. The potentized homeopathic drug, Lycopodium clavatum (5C and 15C) has anti-cancer effect on hela cells in vitro. J Acupunct Meridian Stud. 2013;6(4):180-187.
35. Cassam A. Was Kent a Hahnemannian? Br Homeopath J 1999;88(2):78-83.
36. Adler UC, Cesar AT, Padula AE, et al. The Harmful Cure Observed by Hering and Kent in Contrast to Hahnemann's Concept of Gentle Restoration of Health. Homœopath Links 2006;19(03):121-127.
37. Hughes Richard. A manual of pharmacodynamics. 5th ed. London: Leath and Ross; 1886.
38. Hatfield G. Encyclopedia of folk medicine: old world and new world traditions. ABC-CLIO; 2004.
39. Hauptman PJ, Kelly RA. Digitalis. Circulation 1999;99(9):1265-1270.
40. Zahid H, Rizwani GH. Digitalis purpurea L.: A Concise Drug Review with Probable Clinical Uses. Hamdard Med 2016;59(2):25-32.
41. Herring.C. Guiding symptoms of our Materia medica, Philadelphia: The estate of constantine hering;1891:1-10
42. Clarcke J H. Dictionary of homoeopathic Materia medica. 1st ed. New Delhi: B. Jain Publishers (P) Ltd;1985
43. Kriplani P, Guarve K, Baghael US. Arnica montana L. - a plant of healing: review. J Pharm Pharmacol. 2017;69(8):925-945.
44. Teves Mauricio Roberto, Rotelli Alejandra Ester, Wendel Graciela Haydée, et al. Records of Medicinal Plants Utilized as Gastroprotective and for Treatment of Gastrointestinal Ulcers, Gastritis, and Heartburn in Argentina: A Survey of the Literature. J Herbs Spices Med Plants 2015, 21(4), 333–371.
45. De las Heras B, Slowing K, Benedí J, et al. Antiinflammatory and antioxidant activity of plants used in traditional medicine in Ecuador. J Ethnopharmacol. 1998;61(2):161-166
46. Baliga MS, Fernandes S, Thilakchand KR, D'souza P, Rao S. Scientific validation of the antidiabetic effects of Syzygium jambolanum DC (black plum), a traditional medicinal plant of India. J Altern Complement Med. 2013;19(3):191-197.
47. Boger CM. Studies in the philosophy of healing, 2nd reprint ed. New Delhi: B Jain publishers Pvt Ltd; 2004
48. Swayne J. Homoeopathy in the NHS: A holistic and interprofessional challenge. J Interprof care 1995;9(1):53-59.
49. Clarcke J H. The prescriber:A dictionary of the new therapeutics. 2nd American ed. Philadelphia: Boericke & Tafel;1899.
50. Rampolli FI, Kamler P, Carnevale Carlino C, et al. The Deceptive Mushroom: Accidental Amanita muscaria Poisoning. Eur J Case Rep Intern Med. 2021;8(3):002212.
51. Voynova M, Shkondrov A, Kondeva-Burdina M, et al. Toxicological and pharmacological profile of Amanita muscaria (L.) Lam.–a new rising opportunity for biomedicine. Pharmacia. 2020;67:317-323.
52. Carr BJ, Mihara K, Ramachandran R, et al. Myopia-Inhibiting Concentrations of Muscarinic Receptor Antagonists Block Activation of Alpha2A-Adrenoceptors In Vitro. Invest Ophthalmol Vis Sci 2018;59(7):2778-2791.
53. Karthick C, Periyasamy S, Jayachandran KS, et al. Intrahippocampal Administration of Ibotenic Acid Induced Cholinergic Dysfunction via NR2A/NR2B Expression: Implications of Resveratrol against Alzheimer Disease Pathophysiology. Front Mol Neurosci 2016;9:28.
54. Lau A, Tymianski M. Glutamate receptors, neurotoxicity, and neurodegeneration. Pflugers Arch 2010;460(2):525-542.
55. Allen MJ, Sabir S, Sharma S. GABA Receptor In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021
56. Naaijen J, Bralten J, Poelmans G, et al. Glutamatergic and GABAergic gene sets in attention-deficit/hyperactivity disorder: association to overlapping traits in ADHD and autism. Transl Psychiatry 2017;7(1):e999.
57. Niswender CM, Conn PJ. Metabotropic glutamate receptors: physiology, pharmacology, and disease. Annu Rev Pharmacol Toxicol 2010;50:295-322.
58. Newcomer JW, Farber NB, Olney JW. NMDA receptor function, memory, and brain aging. Dialogues Clin Neurosci 2000;2(3):219-232.

59. Huang XT, Li C, Peng XP, et al. An excessive increase in glutamate contributes to glucose-toxicity in β-cells via activation of pancreatic NMDA receptors in rodent diabetes. Sci Rep 2017;7(1):1-4
60. Kawahara M, Kato-Negishi M. Link between Aluminum, and the Pathogenesis of Alzheimer's Disease: The Integration of the Aluminum and Amyloid Cascade Hypotheses. Int J Alzheimers Dis [serial online]. 2011;2011:276393. Available at: https://www.hindawi.com/journals/ijad/2011/276393/. Accessed January 10, 2022.
61. Biren shah,.Seth A.K. Textbook of Pharmacognosy & Phytochemistry, 1st ed. India: Elsevier;2010.
62. James A.Duke. Handbook of Medicinal Herbs.Second ed. USA: CRC Press LLC;2002.
63. Jiang Z.G.,Dun N.J. Actions of acetylcholine on spinal motoneurons. In : Dun NJ, Robert L.Perlman eds. Neurobiology of acetylcholine. New York: Plenum Press;1987.
64. Perera RK, Fischer TH, Wagner M, et al. Atropine augments cardiac contractility by inhibiting cAMP-specific phosphodiesterase type 4. Sci Rep 2017;7(1):15222.
65. Buels k.s., Fryer A.D.Muscarinic Receptor Antagonists: Effects on Pulmonary Function. In: Fryer A., Christopoulos A, Nathanson N. eds. Handbook of Experimental Pharmacology, Muscarine Receptors. Heidelberg: Springer Berlin ;2012;208: 317- 341
66. Moulton BC, Fryer AD. Muscarinic receptor antagonists, from folklore to pharmacology; finding drugs that actually work in asthma and COPD. Br J Pharmacol 2011;163(1):44-52.
67. Albert Enz, Muscarinic Acetylcholine Receptors. In: S.J. Enna, David B. Bylund eds. xPharm: The Comprehensive Pharmacology Reference. Philadelphia: Elsevier; 2007:1-6.
68. Tuomi JM, Chidiac P, Jones DL. Evidence for enhanced M3 muscarinic receptor function and sensitivity to atrial arrhythmia in the RGS2-deficient mouse. Am J Physiol Heart Circ Physiol 2010;298(2):H554-H561.
69. Kevin Davison, Bryan L. Frank. Ethnobotany: Plant-Derived Medical Therapy. In: Paul S. Auerbach, Tracy A Cushing, N Stuart Haris, eds. Auerbach's Wilderness Medicine, 7th ed. Philadelphia: Elsevier;2017: 1502-1528.
70. Jean M. Bokelmann. Calendula (Calendula officinalis): Flower, In: Jean M, Bokelmann, eds. Medicinal Herbs in Primary Care. Philadelphia: Elsevier;2022: 263-267.
71. Kerry Bone, Simon Mills. Herbal approaches to pathological states. Principles and Practice of Phytotherapy. 2nd ed. Newyork:Churchill Livingstone; 2013.
72. Salehi B, Sharopov F, Boyunegmez Tumer T, et al. Symphytum species: A comprehensive review on chemical composition, food applications and phytopharmacology. Molecules. 2019;24(12):2272.
73. Adejuwon Adewale Adeneye, Subchronic and Chronic Toxicities of African Medicinal Plants. In: Victor Kuete, veds. Toxicological Survey of African Medicinal Plants,London: Elsevier;201: 99-133.
74. Garima Malik, Samira Chugh, Anjana Rustagi, et al. Plant species forbidden in health food and their toxic constituents, In: Charis M. Galanakis, eds. Food Toxicology and Forensics.USA: Academic Press;2021:347-378.
75. Kimberlie A. Graeme. Toxic plant ingestions. In: Paul S. Auerbach, Tracy A Cushing, N Stuart Haris, eds. Auerbach's Wilderness Medicine, 7th ed. Philadelphia: Elsevier;2017:1447-1448
76. Hatfield G. Encyclopedia of folk medicine: old world and new world traditions. London: ABC-CLIO; 2004.
77. Leslie KS, Millington GW, Levell NJ. Sulphur and skin: from Satan to Saddam! J Cosmet dermatol 2004;3(2):94-98.
78. Lin AN, Reimer RJ, Carter DM. Sulfur revisited. J Am Acad Dermatol 1988;18(3):553-558.
79. Carbajo JM, Maraver F. Sulphurous Mineral Waters: New Applications for Health. Evid Based Complement Alternat Med [serial online]. 2017; 2017:8034084. Available at: https://www.hindawi.com/journals/ecam/2017/8034084/. Accessed January 10, 2022.
80. Sokrateva TD, Roussev BH, Nashar MA, et al. Effects of sulphur-containing mineral water intake on oxidative status and markers for inflammation in healthy subjects. Arch Physiol Biochem 2021;127(4):327-336.
81. Stuart Close. The Genius of homoeopathy. 1st ed. New Delhi: B Jain publishers (P) Ltd;2008
82. Grams N. Homeopathy—where is the science? A current inventory on a pre-scientific artifact. EMBO reports. 2019 Mar;20(3):e47761.


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**Table 1: Comparing biological activity of the active ingredients of Homeopathic medicines, their respective receptor interaction or molecular pathway and involvement of such receptor interaction or similar kind of molecular pathway in disease condition, symptoms of Homeopathic medicines derived from drug proving and potencies of commonly used in homeopathic practice especially in the earliest period of homeopathic history**

| Medicine Name | Active principle | Mechanism of action of Active principles on the biological system | List of disease conditions - their pathogenesis Similar to the mechanism of the Active principle is involved. | Drug Indication Form Homeopathic Materia Medica | Recommended potencies |
|---|---|---|---|---|---|
| Aconitum nephalus | Aconitin [21,22] | It is a Cardio toxin and neurotoxin [21], Which acts on the voltage-sensitive sodium channels of the cell membranes, thereby causing persistent activation of the sodium channels, which become refractory to excitation of excitable tissues such as the myocardium, nerves, and muscles. The arrhythmogenic properties of aconitine are also by its cholinergic or anticholinergic effects mediated by the vagus nerve [22]. | • Myotonia and Neuromuscular disorders.<br>• Epilepsy,<br>• Long QT. syndrome cardiac arrhythmias [23].<br>• Impaired cognitive performance<br>• In Cancer - The pathological upregulation of Sodium sensitive voltage channels can make cancer cells highly invasive [24]. | • In the upper arm, there is Drawing and Paralytic stiffness.<br>• Cramp-like pain. Oppression in the region of the heart,<br>• Pain in the chest, with contracted pulse or strong and quick pulse. Palpitations with great anxiety, the difficulty of breathing.<br>• Weariness in all the limbs. Legs and feet feel numb.<br>• Delirium, Dullness, and confusion of mind.<br>• Rheumatic pain in the nape.<br>• Convulsions.<br>• Cramps in calves and feet [41] | Mother tinctures, 1x to 6x, 1c to 12c [20,49]. |
| Agaricus muscarius | Ibotenic acid and Muscimol [50,51] | Muscarine is a selective cholinergic agonist. Activation of this cholinergic receptor leads to bradycardia, lowering BP, bronchorrhea, bronchospasm (asthmatic-like breathing), salivation, pupil contraction and blurred vision, tearing, vomiting, and diarrhoea [52]. Muscimol alkaloid is a non-selective Gamma-Amino Butyric Acid-A (GABAA) receptor, an agonist. And Ibotenic acid is an agonist of glutamate receptors [50,51] , specifically at both the N-methyl- D-aspartate (NMDA) and trans- ACPD receptors. This Muscimol and Ibotenic acid act as neurotransmitters in the CNS, stimulating glutamate receptors, | • Stroke<br>• Epilepsy [55],<br>• ADHD [56],<br>• Parkinson's disease,<br>• Schizophrenia, Autism spectrum disorder, and<br>• Major depressive disorder [57].<br>• Acute CNS injury syndromes such as hypoxia/ischemia, trauma, and status epilepticus [58].<br>• Anxiety disorders due to Hyperactivity of glutamatergic transmission [57]. | • Dullness, idiocy, indisposed to perform any labor, especially mental work.<br>• Anxiety, Epilepsy, Chorea.<br>• In the skin, there is a sensation as if pricking from needles in different places.<br>• Sensations as if electric stitches, biting, burning, and stinging are also present in the skin.<br>• Constant desire to urinate. The quantity of urine very much increased, even with diarrhea [41]. | 3x,3c,4c, in skin affections and brain exhaustions lower attenuations indicated [20,49]. |

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| | | causing Confusion, dizziness, tiredness, and visual and auditory perceptual changes [53,54]. | • Neuronal injury caused by Excessive activation of NMDA receptors.<br>• Activation of NMDARs has been proposed to contribute to the progress of diabetes.<br>• Endogenous glutamate aggravates β- cell dysfunction.<br>• Excessive Glutamate excitotoxicity causes neuronal dysfunction and degeneration [59].<br>. | | |
| Alumina | Aluminium Oxide[41] | Aluminium is a neurotoxin that inhibits more than two hundred principal biological functions of plants, animals, and humans. Aluminium also induces the expression of pro-inflammatory genes and proapoptotic genes.<br>Aluminium oxide also causes mitochondrial dysfunction and depletion of ATP, and It causes neurofibrillary degeneration and inhibits the activity of glucose-6-phosphate-dehydrogenase [60]. | • Alzheimer's disease,<br>• Parkinson's disease.<br>• Type 2 diabetes mellitus *[60]*. | • Confused, Great weakness or loss of memory. Confusion and obscuration of intellect.<br>• Paralysis, Locomotor ataxia.<br>• Tremor. Spasms. Slow tottering gait.<br>• Frequent urination is aggravated at night [41]. | 3x to 6x, 3c to 6c [20,49]. |
| Atropha belladonna | Atropine, scopolamine. Anticholinergic alkaloids [61,62]. | Atropine is a mAChR antagonist [63,64]. Atropine blocks the inhibitory effect of AC, leading to tachyarrhythmias [64].<br>Atropine also causes constriction of smooth muscle [65,66]. | • Bronchoconstriction or bronchospasm.<br>• Diverticular disease.<br>• Chronic obstructive pulmonary disease (COPD) [67].<br>• Atrial tachycardia and Atrial fibrillation [68]. | • Catarrh, with cough, coryza, and expectoration of viscid and whitish mucus.<br>• Respiration is short, hurried, and sometimes much oppressed.<br>• Pulse full and quick. Pressing pain in the chest with shortness of breath [41]. | Mother tincture, 1x to 12x & 1c to 12c [20,49]. |
| Nux vomica | Strychnine and Brucine [62] | Strychnine alkaloid is a competitive antagonist at inhibitory neurotransmitter glycine receptors in the spinal cord, brain stem, and higher centres. Strychnine increases neuronal excitability, leading to increased | • Myoclonic disorders,<br>• Muscular spasm,<br>• Conditions were increased muscular activity of the small intestine [29]. | • Great reflex excitability.<br>• The slightest touch brought on spasms.<br>• Severe clonic spasms, Violent, contractive, painful sensation through the whole body. | 1x to 6x & 1c to 12c [20,49] |

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| | | muscular activity [25]. Brucine is an allosteric modulator at cloned M(1) muscarinic receptors. Strychnine poisoning can lead to anxiety, enhanced reflexes, twitching, convulsions, equilibrium disorders, heightened sensory perception, pain, stiff neck, backache, and dyspnea [25,26,27,28]. | | • Cervico-brachial neuralgia, neck stiffness, backache. Rheumatism of muscles of the neck.<br>• Tremor, Spasms, Slow tottering gait [20,41]. | |

**Table 2: Comparing Traditional, Pharmacological effects and Homeopathic Materia medica**

| Name of the drug | Active ingredient | Traditional use | Pharmacological use | Indications in Homeopathic Materia medica Similar to Pharmacological use | Recommended potencies |
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| Calendula officialis | Flavonoids, Carotenes, Saponin, Resin, and volatile oils [69]. | It is used as a topical application for infection and skin irritation. Early American surgeons highly regarded its ability to treat and prevent post-surgical infections [69]. | Initial treatment of lacerations, abrasions, and scalds; cleaning of a wound; and for generalized inflammation of mucous membranes. Fluid extract of the flower is applied for wounds [69].<br>Gingivitis, radiation mucositis, vaginal candidiasis, episiotomy healing, diaper dermatitis, venous and neuropathic ulcers, radiation dermatitis, reducing inflammation in the throat and stomach [70,71]. The resin content of the calendula is responsible for the antimicrobial and anti-inflammatory action of the topical application [69]. | Lacerated wounds, chronic unhealed wounds.<br>Varicose swellings and ulcers.<br>To prevent caries or necrosis.<br>Keratitis and iritis, Traumatic conjunctivitis.<br>Sclerotic wounded: choroidea and corpus vitreum protruded. Dry tongue, red and cracked. Profuse, offensive watery discharge from the vagina, with great exhaustion.<br>Ulcerations of os uteri. Induration of the uterus.<br>Promotes granulations and prevents disfiguring scars [41]. | MT, 1x to 12x 3c [20,49]. |
| Symphytum *officinale* | Pyrrolizidine alkaloids, such as lasiocarpin and symphytine [28,72],<br>Protein Allantoin [73]. | To treat bone fractures, gout, inflammatory diseases, thrombophlebitis and hematomas.<br>It has been widely used in the United Kingdom to treat problems associated with muscles, tendons, and ligaments.<br>Symphytum herbal teas are used to | It Acts as an anti-inflammatory agent and promotes the healing of sprains, bruises and open wounds when applied topically.<br>The roots and leaves of this plant contain the protein allantoin, which promotes wound and bone healing by stimulating cell proliferation.<br>Herbal tea of this plan is used to treat gastric | Diseased spinous processes, Inflammed bones.<br>Psoas abscess.<br>Facilitates the union of fractured bones reduce pain and favours the production of callous.<br>Backache, Sprains [41,49]. | MT, 1x to 3x [20,49]. |

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| | | treat chronic conditions of gastric ulcers and congestion of the lungs [74] | ulcers, rheumatic pain, arthritis, bronchitis, and colitis [72,73]. | | |
| *Digitalis purpurea* | Digitoxin [75] | Dropsy, boils, and other skin diseases, Used to stop lactation at weaning, treatment of coughs, colds and fever, and heart disease [76] | The Digitalis glycosides get bind to an enzyme called potassium ATPase and by blocking potassium from binding to this enzyme. So, the heart muscle is exposed to calcium for a longer period. It leads to forceful contraction of the heart. These effects Of Digitalis glycosides on the heart are induced by the ion-pumping function and signal-transducing function of Na+/K+ -ATPase. Digitalis glycosides are used as a therapeutic agent for congestive heart failure [39,40]. | Dropsy, Angina pectoris, Cardiac dropsy and great anasarca, Venous, passive congestion, with the pale or livid colour of the face; coldness of skin; swelling and painfulness of feet; all in consequence of cardiac anomalies, Cyanosis [20,41,49]. | MT, 1x to 12x & 1c to 12c [20,49] |
| *Sulphur* | S | Used to treat many skin conditions, such as fungal infections, scabies, psoriasis, eczema, and acne, and seborrhoeic eczema.<br>It is also used in cosmetic preparations [77]. | Sulfur has antifungal, antibacterial and keratolytic properties. Direct interaction between sulfur particles and keratinocytes leads to the formation of hydrogen sulfide, which produces Keratolytic action. The degree of such interaction and therapeutic efficacy is inversely proportionate to the particle size of sulphur. And it has a wide range of anti-inflammatory activities [78.79.80]. | Itching in the skin, urticaria, cracks and cuts in the skin of hands, especially on joints, painfully sore, Itching vesicular eruption on the back of the hand. Boils, acne punctata. Eczema, Scabious eruptions [41,49]. | 1x to 12x & 1C to 12c [20,49]. |