HOMEOPATHY IN THE TREATMENT OF GASTROINTESTINAL CONDITIONS IN ANIMALS: PART 1 — WHAT IS HOMEOPATHY?

Shelley R. Epstein, VMD, CVH and Iris R. Bell, MD, PhD
2. 10645 N Oracle Road, Suite 121–126, Tucson, AZ 85737.

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ABBREVIATIONS
GI — Gastrointestinal
E. coli — Escherichia coli
PEMS — Poultry enteritis mortality syndrome
CAS — Complex adaptive system
IBD — Inflammatory bowel diseases
NPs — Nanoparticles
HM — Homeopathically-prepared medicines

Introduction
The management of gastrointestinal (GI) problems in livestock and companion animals presents medical and economic challenges. In cattle, neonatal calf diarrhea is recognized worldwide as one of the greatest challenges for both the beef and dairy industries (1, 2). Approximately one-third of U.S. beef cow-calf owners agree that it has an economic impact on their operations (3). According to a 2008 USDA report, GI problems account for more than 50% of unweaned dairy heifer deaths since 1991 (2). In spite of receiving antimicrobials in the milk during an average of 25.2% of the production time, 5.3% of special-fed veal calves were diagnosed and treated for diarrhea with an increased mortality risk (hazard ratio=11.0) and a reduced hot carcass weight average of 9.2 kg with reduced carcass quality (4).

*Escherichia coli* is a major cause of postweaning diarrhea in pigs, responsible for economic losses due to mortality, morbidity, decreased growth rate and cost of medication (5). Porcine epidemic diarrhea virus, first detected in May 2013, results in poorer performance of growing pigs, an increase in mortality of 11%, an increase in feed conversion ratio of 0.5, and a decrease in average daily gain of 0.16 lb/day (6).

Poult enteritis mortality syndrome (PEMS), first recognized in 1991, is a highly infectious disease of young turkeys with an unknown inciting agent in spite of the presence of many viruses, bacteria, and parasites in infected birds. PEMS causes serious financial losses to the turkey industry (7, 8).

In small animal medicine, acute and chronic GI problems often entail hospitalization, diagnostic work-ups involving ultrasonography, endoscopy or exploratory laparotomy with biopsies and bacterial cultures and sensitivities, and, in the
case of chronic conditions, often years of multi-modal medical management (9, 10).

Antibiotic use in the prevention and treatment of GI diseases in animals has been clearly linked to antibiotic resistance in humans (11). The majority of antibiotic use worldwide is in food-producing animals; however antimicrobial resistance in pets may serve as a source of resistant bacteria in human contacts (11–14).

Homeopathy was originally developed by the German physician-chemist Samuel Hahnemann, MD, out of concerns about the toxicity of available treatments for acute and chronic illnesses of his day (15). Homeopathy is a complete system of medicine used worldwide, with an excellent safety track record (16). It was founded on the principle of “similia similibus curantur,” or “let likes be cured by likes” (17). Medicines that can cause a specific set of symptoms when given to healthy people are used to cure those same symptoms (signs in animals) when they appear in the sick patient.

Although skeptics reject homeopathy as chemically “implausible,” newer evidence on the physico-chemical and nanoparticulate properties of homeopathic medicines and on adaptive nonlinear responses of living systems to low-dose treatments casts doubt on the simplistic dismissal of the entire field (18–40). Furthermore, a growing body of clinical evidence, including comparative effectiveness trials on thousands of human patients, a strong safety record and cost-effectiveness data in people, make homeopathy a therapeutic strategy that merits consideration (16, 41–45).

As an alternative to conventional therapies, this article presents a clinically focused, evidence-based perspective on the rationale for using homeopathic medicines for treatment of GI illness in animals.

**OVERVIEW OF HOMEOPATHY**

Homeopathy is based on a set of principles: Similia similibus curantur; drug provings (pathogenetic trials) to document symptom patterns elicited by a given medicine in a healthy individual; use of the minimum dose necessary to evoke adaptive or counter-action responses without toxicity in a recipient with an acute or chronic condition; dynamization (potentization) of the medicines by extensive milling or grinding of dry source materials and/or repeated succussions or agitation of the material in liquid form during preparation steps; focus on selection of the single potentized medicine best matched to the state of the recipient at the time of administration; a life or vital force in the body; and a theory of chronic disease.

**Similia Principle**

The similia principle is the basis of homeopathy. All medicines are prescribed based on their resemblance of the condition in the sick patient to the symptoms elicited by the medicines when given to the healthy human test subjects. For example, when Arsenicum album, the homeopathic remedy derived from arsenic, was tested on people, they reported symptoms that included frequent thirst, nausea, vomiting of blood, diarrhea, restlessness with severe weakness — and all symptoms worse after midnight (46). When this medicine is administered homeopathically, it is indicated to treat, for example, a dog that awakens its owners at 1:00AM, experiencing diarrhea and vomiting accompanied by pacing around all night while wanting to drink small amounts of water. Arsenicum album, when dispensed homeopathically, is referred to as the simillimum. No single homeopathic medicine is appropriate for all cases of a specific conventionally diagnosed disorder or symptom. Homeopaths look for the larger pattern or context of symptoms and behaviors that an animal or person exhibits to select the best indicated single medicine for the overall state of the individual.

Hahnemann described three other methods of prescribing, none of which could achieve a curative response. The antipathic, enantopathic or palliative method is based on prescribing medicines that oppose or suppress expression of the disease symptoms. Non-steroidal anti-inflammatory or anti-diarrheal drugs are examples of this type of prescribing.

In contrast, in the allopathic method medicines are prescribed or procedures instituted that possess no direct connection, either similar or opposite, to the disease symptoms. The use of antibiotics to treat diarrhea is one such example. Even in bacterial gastritis, antibiotics are considered an allopathic treatment, as the signs of gastritis are neither opposite nor similar to those of antibiotics whose principle action is to kill or inactivate bacteria. Unfortunately, the term “allopathic” has achieved more common use and is incorrectly applied to describe all conventional treatments in contrast to more natural therapies.

The third method, isopathy, involves giving the same substance as that associated with the disease. Typically, disease products like nasal discharges or pus from the teat of a cow with mastitis are potentized and given to the sick patient. While not considered classical homeopathy, this method of prescribing is occasionally used by veterinarians, especially in refractory cases and herd health situations (47).
The Provings

The provings, or pathogenetic trials as they are often termed in the literature today, are the tests performed with substances to learn their medicinal effects (48). These provings were Hahnemann’s answer to the unfounded theories of treatment in his time. The human test subjects are known as provers. Unlike pharmaceutical drug testing, animals are not used in homeopathic provings. Human test subjects are uniquely able to describe in great detail their mental, emotional and physical symptoms, while animal test subjects would provide information that is only observational in nature.

In *The Organon of the Medical Art*, Hahnemann’s classic work detailing homeopathy, he provided detailed instructions on how the provings were to be performed (49). He conducted his experiments on healthy humans of both sexes and all “constitutions.” The individuals were given small doses of a substance and asked to record the symptoms that ensued. These symptoms were to be noted on the mental, emotional and physical levels.

Of highest importance in describing the symptoms and differentiating the medicines were the modalities, or what made the symptoms better or worse. For example, in the proving of poison ivy, *Rhus toxicodendron* the provers experienced symptoms such as leg pains that were ameliorated by movement of the affected parts, in contrast to the leg pains experienced by provers of wild hops, *Bryonia alba*, which were worse by moving the affected parts (50, 51).

In a proving, once all the symptoms are recorded, they are collated, commonalities found, and a hierarchy is usually revealed emphasizing the most frequently reported symptoms and modalities, along with any strange/rare/peculiar symptoms and sensations. These symptoms are then compiled into a *materia medica* which contains description of the medicines. To facilitate their discovery when the clinician is searching for the medicine that matches the patient’s symptoms, these proving symptoms are entered into a *repertory*, which is a list of all symptoms with their corresponding medicines.

The Minimum Dose

When Hahnemann began his experiments with homeopathy, he administered to his patients small doses of the indicated substances. He found that patients initially experienced a symptom aggravation, followed by an amelioration. For example, a patient given a small dose of arsenic for a GI disorder might initially respond by more vomiting and diarrhea followed by recovery. Hahnemann circumvented this by giving smaller and smaller doses, actually diluting the material, and finding the aggravations were diminished while the curative response increased. He concluded that the smallest dose indicated should be given to the patient (the “minimum dose”) to prevent such aggravations.

Dynamization or Potentization of Remedies

In making each of these serial dilutions, Hahnemann rigorously pounded the solution on a leather-bound book (a process termed “succussion”). His thinking was to evenly distribute the material throughout the solution. This evolved into the process of *dynamization*, or *potentization*. Although it is questionable as to whether or not Hahnemann was aware of Avogadro’s number, the reciprocal of which in theory marks that point at which a dilution would contain no material source substance, Hahnemann proceeded with administering dilutions of medicines that exceeded the reciprocal of this “critical” number and found that the effects persisted while the aggravations did not. Multiple modern laboratories have demonstrated the release of silicates, including related nanostructures, from the glassware container walls as a result of the succussion process (28, 33, 52, 53).

During the process of potentization, a substance is diluted initially in alcohol at a concentration that might range between 20% to 90% v/v and then in water. Certain dry or insoluble source substances, like minerals, for example, are first *triturated*, or ground on dry milk sugar and diluted for the first few dilutions using this milk sugar. At each successive dilution in the liquid, the container is shaken, or *succussed*. While medicines were laboriously made by hand initially, today homeopathic pharmacies often utilize an automated process that includes mechanical dynamizers (32).

The Single Medicine

The provings brought out a host of useful information. Since each medicine was able to produce a variety of symptoms in the provers, and each medicine produced symptoms unique to itself, Hahnemann found the need for polypharmacy became obsolete. One medicine was capable of curing the full set of symptoms produced in the sick patient.

These symptoms can be categorized by various schemes but tend to fall under one of 9 categories. General symptoms are those affecting the whole patient, like becoming worse in rainy weather, desiring warmth or being aggravated by exertion. Particular symptoms are those affecting a specific location.
on the patient, like a prolapsed rectum or inflamed anus. Concomitants symptoms occur at the same time as the main complaint, for example a skin eruption that occurs during a fever, or ocular discharge that occurs with gastroenteritis. Alternating symptoms rotate in their occurrence, like pruritis alternating with diarrhea.

The term modality in homeopathy pertains to what makes a complaint better or worse. This could be lying on the affected leg, cold compressing the area or gentle exercise. It could also be that the leg is worse every day at 11AM or in cold rainy weather. Modalities are very important in distinguishing one medicine from another.

Symptoms that are considered strange/rare/peculiar are those that are unexpected. For example, appetite increased with vomiting, or a headache ameliorated by bright light would be considered strange/rare/peculiar.

Mental and emotional symptoms are usually grouped together in animal patients and include both cognitive signs like getting lost in the house and true emotional signs. For example, one cat with diarrhea might be very clingy while another might be very nervous or anxious and fruitlessly pacing. The mental/emotional symptoms are most significant when they are changed from the patient’s well state.

Physical symptoms include the specific, detailed physical symptoms of the patient such as the color, texture, and odor of the stool or whether or not the diarrhea is irritating to the skin.

Finally, sensations are not directly relevant in veterinary medicine, but are very helpful in human homeopathy. Nevertheless, some sensations experienced by the provers are known to translate into the physical symptoms in the sick patient. For example, a sensation that a particular body part is enlarged can be considered when the animal patient’s signs include enlargement of that body part.

Disease as a Dynamic Process
Like other non-conventional therapies such as Traditional Chinese Medicine, homeopathy is based on the principle that a life force, or vital force, animates the body. Without this life force, as occurs with death, self-preservation is lost and the body starts to break down, losing coordination of its chemical and electrical processes, its awareness and senses, and its ability to direct itself to consciously and unconsciously move its parts. In homeopathy, disease is considered a mistunement of this life force.

In the healthy individual the life force that governs the physical body enables it to function at its maximum capability. When an individual becomes ill, it is a dynamic influence on the body that influences the life force to produce signs and symptoms of disease. Importantly, disease, or disease, is therefore considered a suffering of the life force forming a complex with its resultant signs and symptoms. Accordingly, diseases can only be removed and the patient truly cured when dynamically acting medicines are given. These medicines act by dynamically retuning the diseased life force with the resultant disappearance of the signs and symptoms.

Apart from a vitalistic conceptualization, contemporary homeopathic researchers have instead identified modern scientific constructs that facilitate study of the nonlinear dynamics of disease and healing (54–60). They note that each animal, human being or plant as a living system is a complex adaptive system (CAS). Each CAS involves a self-organized interconnected network of parts. Changes in one part will lead to changes across the rest of the network (61, 62). The interactions of the parts within the larger network lead to global emergent properties of the organism as a whole. Changes in the organism’s external or internal environment elicit adaptive changes across the network of the organism to improve its chances of survival in the ever-changing environment.
Rather than a simple flow of events from above downward (vitalism) or from bottom upward (mechanism), complexity scientists focus on studying the interrelationships and nonlinear interactions between the parts and the emergent whole (59, 63, 64). In the context of a self-organized CAS, there are several different organism-dependent endogenous nonlinear amplification processes that may contribute to the large response of an animal to the relatively weak signal properties of the simillimum homeopathic medicine. Such endogenous adaptive amplification phenomena include stochastic resonance, time-dependent sensitization and hormesis (65) [Table 1].

The vitalistic conceptualization stands in important contrast to conventional medicine practices which are based on a more material understanding of disease. According to the conventional methods, it is the signs and symptoms that are to be removed or controlled, with no consideration for any underlying dynamic process. Homeopathy considers treatment that only addresses the signs and symptoms to be acting either palliatively or suppressively. When palliation occurs, for example when chronic diarrhea in a dog is treated with metronidazole, the signs are expected to return if the medicine is discontinued. When the signs are suppressed, as when the diarrheal manifestation of chronic disease cannot be expressed due to chronic medical management, a deeper pathology is expected to develop, like degenerative joint disease or hypothyroidism, for example.

It is important to note exceptions to the above. Although Hahnemann was firm in his definition of disease, he was clear that certain mechanical conditions such as broken bones, bleeding, wounds and foreign bodies do require surgical management. Hahnemann also noted that palliative or antipathic treatments were indicated in emergency cases such as drowning, freezing and asphyxiation. Because these latter events typically happen to healthy bodies, once the life is restored to them, the system should be able to resume its previously healthy course. Homeopathy can nevertheless be of use in these conditions to manage the pain, concomitant symptoms/signs and sequela that arise.

With the discovery and proliferation of the germ theory, especially as we understand it today, this dynamic understanding of disease might require further elucidation, especially as it refers to infectious diseases. Disease-causing microorganisms vary in their ability to infect individuals and populations. Some agents with high virulence can generate epidemics, while others are responsible for only sporadic infections in a population. The intensity of the disease in individuals along this entire spectrum also varies. Homeopathy explains this by the individual’s “susceptibility.” It is the susceptibility or lack thereof which prevents pathogens from being absolute in their ability to infect all individuals all of the time. While one dog may be exposed to parvovirus in the shelter and shed the virus in its stool while remaining asymptomatic, another may succumb to the virus and die. Nutrition, exercise, rest and stress levels all play a role in susceptibility.

**Theory of Chronic Disease**

In 1828, with his publication of *The Chronic Diseases*, Hahnemann established a radical concept of disease. He declared that chronic sickness in humans arose from 3 sources: unhealthy lifestyle, “persistent, aggressive and ruinous [medical and surgical] treatments…(often even for minor diseases), or one of 3 infectious diseases” (49). Using the term **miasm** for these infectious diseases, a word which was understood at the time as a noxious influence and is now considered an infectious agent, Hahnemann delineated 3 main miasms: *psora*, or the itch disease; *sycosis*, arising from gonorrheal infection; and *syphilis*. In Hahnemann’s scheme, when people were infected with 1 of these 3 common diseases, they often received therapy which did not achieve an actual cure, but rather placed the disease in a latent form, only to arise later with potentially new symptoms. Moreover, these miasms could be passed on to offspring via inheritance, rather than through direct infection. The variety of symptoms exhibited by a patient were not to be considered

<table>
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<tr>
<th>Adaptive Phenomenon</th>
<th>Definition</th>
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<tr>
<td><strong>Stochastic Resonance</strong></td>
<td>Amplification of a weak signal by concomitant presentation within a larger random noise background. The weak signal’s frequency overlaps a frequency within the larger noise</td>
<td>Animals &amp; Humans, especially in sensory systems related to predator detection as well as in neural networks</td>
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<td><strong>Time-Dependent Sensitization</strong></td>
<td>Progressive increase in response magnitude initiated by the passage of time between repeated intermittent exposures to a small stimulus and elicited by subsequent re-exposures to the same or a cross-sensitized stimulus</td>
<td>Animals &amp; Humans</td>
</tr>
<tr>
<td><strong>Hormesis</strong></td>
<td>Low dose stimulation versus high dose inhibition effects by drugs, environmental chemicals, nanoparticles, and/or radiation</td>
<td>Animals, Plants, &amp; Humans, as well as cells in cell culture</td>
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new diseases in and of themselves, but rather part of the larger disease picture of the patient. The only way to cure the patient, he asserted, was to cure the underlying chronic disease, which included all of the symptoms of the patient (66).

Hahnemann's designation of the 3 miasms is not without controversy. While his concept of symptoms as part of a more encompassing disease afflicting the patient forms one of the basic tenets of homeopathy, the origin of these miasms arising from infections in humans raises questions of applicability in our animal patients. Many veterinarians reference the miasms for the *patterns* of disease they describe, corresponding to physiologic responses to stress (67). Hahnemann’s psora corresponds to inflammation and functional changes, like vomiting and diarrhea to rid the body of toxin ingestion. Hahnemann’s sycosis corresponds to the body's first stage of structural changes, and includes fortification and overproduction of tissue. Thickening of small intestine might be seen in a patient with inflammatory bowel disease (IBD) in the syphilitic stage. Hahnemann’s sycosis represents the second stage of structural change, the destruction of tissue that resembles the pathology seen in ulcerative colitis and gastric ulcers. Notably, the concept of transgenerational inheritance of pathological epigenetic tendencies has support in recent animal studies. For example, Crews, et al., reported altered neurobehavioral stress responses as well as mate preferences in the offspring 3 generations removed from an index animal with a discrete exposure to an environmental chemical toxicant (68–72).

*Acute disease* has a very narrow definition in homeopathy. Typically, acute disease refers to those conditions that are self-limiting and will resolve in a moderate period of time. This definition includes acute infections, physical traumas, sprains/strains, fatigue, emotional arousals, etc.

In contrast, *acute flare-ups of chronic disease* are not considered true acute diseases from a homeopathic perspective. In this regard, cystitis in cats is a sign of chronic disease, as the afflicted cat’s susceptibility to certain emotional stressors, for example, might lead to recurrent expression via inflammation in the bladder. Likewise, recurrent bouts of colitis in a dog are considered acute flare-ups of chronic disease.

True acute diseases can be pushed into a latent state, becoming chronic diseases. This scenario typically occurs when the body is not allowed to express its adaptive mechanisms to clear the disease and the signs/symptoms are suppressed with medical or surgical management. Additionally, a treatment can result in adverse events, taking the patient into a chronic disease state. Alternately, the patient’s underlying chronic disease may not allow it to clear the simple acute disease in a moderate period of time. This latter scenario may occur when an unhealthy older dog contracts a simple upper respiratory virus that develops into pneumonia.

In veterinary medicine, chronic disease is seen in its subtle as well as overt manifestations. For example, a dog with mild chronic ocular discharge and bile vomiting when hungry in the morning is considered to have chronic disease. Likewise, a German Shepherd Dog with lameness from degenerative joint disease in the hips who also suffers from chronic diarrhea would be considered as having one disease.

In accordance with the theory of chronic disease, homeopaths are cognizant of 3 courses for a disease: *palliation, suppression* and *cure*. The goal of a successful homeopathic prescription is to cure — to rid the patient of all signs permanently without the need for further medicating, while increasing the patient’s overall well-being. When palliation occurs, the patient’s signs may disappear temporarily, but return in due time, sometimes with even more force or persistence as in a case of IBD managed with medications. When suppression occurs, the symptom disappears, but “deeper” more serious symptoms will replace it. This is the case with excision of a cutaneous tumor that is followed by metastasis, or by hiding and inappetence in a cat being medicated for chronic vomiting [Figure 1].

**THE MEDICINES**

Homeopathic medicines are made from substances in the animal, vegetable, fungal and mineral kingdoms. The animal kingdom remedies include those made from whole creatures, like *Apis mellifica* derived from the male honeybee; animal parts, like *Castor equi* from the rudimentary thumbnail of the horse; and milk from different mammals, like *Lac caninum* from bitch’s milk. Many medicines are derived from venomous animals, like *Lachesis muta*.

Medicines derived from the vegetable kingdom include many made from herbs as well as trees, grasses and flowering plants. While many of the live substances in this category are considered poisonous, their homeopathic value lies in their ability to cure these symptoms similar to poisonings in sick patients. For example, *Conium maculatum* made from the Poison Hemlock is a useful medicine in hind end weakness of older animals.

The fungal medicines broadly include algae, mushrooms, lichens and molds. Examples include *Lycopodium clavatum*, the
Mineral medicines include anything found on the Periodic Table and their salts, such as Phosphorus, Calcarea phosphorica (calcium phosphate), and Sulphur.

Medicines derived from products of diseased patients are called nosodes. These include Lyssin from the saliva of a rabid dog, Syphilinum from the syphilitic lesion, and Tuberculinum bovinum kent derived from the pus (including the bacteria) from an abscess of a tubercular human.

Potencies
As mentioned above, the medicines are potentized, or dynamized. This process involves serial dilutions and succussions. Dilutions are made on one of three scales: X or decimal are 1:9 dilutions; C or centisimal are 1:99; and Q or LM are 1:50,000. The nomenclature is such that a 200C potency of a substance would indicate that it has been diluted 1:100 200 times, with 10 or more succussions between each step. When the final dilution has been prepared, the liquid form of the medicines is often dried onto sucrose or lactose pellets for administration to the patient. Although most mainstream scientists would consider the higher homeopathic “potencies” to be too dilute to exert effects, 1 animal study instead indicated that, compared with their less dilute and less succussed counterparts at lower potencies, higher homeopathic potencies from the same source material induced effects for a longer period of time (73).

Standardization
In the United States, the Food and Drug Administration regulates homeopathic pharmacies. Medicines are prepared according to strict regulations following the Homœopathic Pharmacopœia of the United States, first published in 1897 and updated continuously (http://www.hpus.com/). These regulations oversee the safety, efficacy and standardization of the remedies. Considerations include the characteristics of the crude material used in making medicines, alcohol percentages of homeopathic tinctures and specifications for minimum potency levels to be used in potentially toxic medicines.

Administration
Medicines are administered in three forms: as dry pellets, as a solution of either dry pellets or tincture dissolved in water, or by olfaction. Dermal administration is possible but less commonly used. The actual administration of the medicine depends on the species involved and its approachability.

In dogs and cats, the medicines are usually given orally either as dry pellets, (sometimes crushed first to enable them to stick to the mucous membranes) or dissolved in water. Dry pellets can be crushed in a small envelope and then poured into the rostral...
portion of the mouth. Dissolved pellets can be given via a small syringe. For cats or dogs that cannot be medicated orally, the medicine can be dissolved in a small amount of water or milk.

For administration to all species, medicines can be given dry or wet in the mouth; via dropper onto the nose (turtles); by spraying/misting at the animal or on the nose (using squirt guns of various sizes and pump-up garden sprayers); in water buckets, tanks, and medicators; on the vulva (mares and cows); soaking in flat/dry molasses treats (horses); directly hand-feeding (pigs); in feed or hidden in apples and carrots (horses). Medicines can be deposited directly into fish tanks.

When one medicine is indicated to treat an entire herd or flock of animals, the medicine can be placed directly into the water troughs or sprayed/misted onto the herd/flock.

Olfaction is typically reserved for the overly sensitive individual patient. This patient is typically sensitive to many environmental stimuli. The medicine is held up to the nose and the patient is allowed to briefly sniff the medicine. Studies in human subjects indicate that sniffing an individually-salient homeopathic medicine can elicit changes in electroencephalographic patterns different from those of placebo sniffing (74–76).

Mechanism of Action
Consistent with the idea of disease as a dynamic alteration in the patient, Hahnemann explained the mode of action of medicines based on this principle. The similar but stronger dynamic affection (the homeopathic medicine) extinguishes the weaker one (the patient’s disease). In other words, the medicine, being similar to the disease but stronger, is able to remove the disease, and this occurs at a dynamic, not material, level.

In terms of nonlinear dynamics, human studies suggest that the correct homeopathic medicine triggers a process that clinicians and patients term “unstuckness” (77). That is, the recurring physiological and behavioral patterns of illness that the individual has been experiencing and perhaps reexperiencing are broken, allowing the system to reset functioning across the entire network of the body as it reestablishes a new homeostatic equilibrium closer to wellness (60).

The nature of homeopathic medicines and their capacity to exert any effects have generated much debate between proponents and skeptics over the past 2 centuries. The primary argument of skeptics is that the serial dilutions should remove even “trace amounts” of active source materials and render most homeopathic medicines as inert placebos.

On the contrary, in recent years, multiple different research laboratories showed that verum homeopathic medicines differ from placebo controls in key structural and physical chemistry properties. These properties include the presence of nanoparticles, emission of unique electromagnetic and optical signals, and the ability to affect solvatochromic dyes via electron transfer (19–24,30,31,78–80). The electromagnetic signals have reportedly induced distance-dependent effects on plant seedling development and modified biological activity of bacteria (30, 31, 81) [Table 2, on page 25].

In the case of nano-scale materials in homeopathically-prepared medicines, there are now over a dozen different papers in the peer-reviewed literature using a variety of modern technologies to document nanostructures of source material, silica and/or solvent. Nanoparticles (NPs) are generally less than 100 nanometers in size; the smallest nanoparticles, called quantum dots, are less than 10 nanometers in size. Skeptics might still insist that the quantities of NPs are still too small to exert conventional drug-like effects. However, as the nanoscale form of a drug or herb typically heightens its bioavailability and biological effects over its respective ordinary bulk form by orders of magnitude, the amounts of NPs present are not likely a limitation for lower potency homeopathic medicines (29, 33, 52, 82–96).

For higher potency homeopathic medicines, the signal properties of the medicine for the animal, person or plant as a CAS may be most relevant. For the endogenous amplification phenomena mentioned earlier, i.e., experts in the study of stochastic resonance, time-dependent sensitization and hormesis have found that a weak signal or low dose of a given stressor or environmental agent (drug, chemical, electromagnetic emission and/or radiation in nature) serves as a danger signal to the organism to initiate adaptive biological and behavioral changes in preparation for some potential future environmental threat (97). The salient threat would be a potential future larger amount or dose of the original low level warning signal or of a cross-reactive agent. Some animals, for instance, can detect a predator odorant at the level of less than 1 part per trillion (98).

Nanoparticles are among the types of environmental agents that can set the damage-associated molecular pattern recognition events in cells into motion, including but not limited to modulation of gene expression, heat shock protein activation, cytokine release and nervous system function (99, 100). In fact, prior studies have demonstrated that homeopathic medicines can similarly mobilize and modulate metabolic, immune and
nervous system mediators involved in the cell danger response network (97). In specific, previous studies have shown that various homeopathic medicines can elicit changes in gene expression, heat shock protein activation, cytokine release and immune activity and/or central nervous system function (35, 58, 75, 96, 97,101–109).

### Table 2. Summary of basic science findings reported in homeopathically-prepared medicines (HMs)

<table>
<thead>
<tr>
<th>Study</th>
<th>Technology</th>
<th>Homeopathically-prepared materials</th>
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<tbody>
<tr>
<td>Chikramane et al. (2010) (29)</td>
<td>Transmission electron microscopy, ICP-AES</td>
<td>Gold, silver, copper, zinc, platinum, tin NPs in HMs up to 200C. Concentrations plateaued at 6C potency. NP size ranges included &lt;5–10 nanometers up to &gt;50 nm.</td>
</tr>
<tr>
<td>Upadhyay and Nayak (2011) (33)</td>
<td>Scanning electron microscopy</td>
<td>Pulstilla, Belladonna, Colchicum (plants) NPs up to 15C.</td>
</tr>
<tr>
<td>Chikramane et al. (2012) (93)</td>
<td>Transmission electron microscopy</td>
<td>Gold NPs up to 15C.</td>
</tr>
<tr>
<td>Demangeat (2010, 2013) (52,53)</td>
<td>Nuclear magnetic resonance</td>
<td>Silica/lactose nanostructures up to 21C.</td>
</tr>
<tr>
<td>Das et al. (2013) (92)</td>
<td>Transmission electron microscopy, zeta potential</td>
<td>Silver NPs biosynthesized by Thuja, Hydrastis, Phytolacca, Gelsemium plant mother tincture extracts.</td>
</tr>
<tr>
<td>Barve and Chaughule (2013) (91)</td>
<td>Dynamic light scattering</td>
<td>Terminalia arjuna, Holarrhena plant mother tincture NPs to approximately 13 nm sizes with succussions.</td>
</tr>
<tr>
<td>Elia et al. (2012; 2014) (85,95)</td>
<td>Atomic force microscopy, fluorescence microscopy, FT-IR and UV-vis spectroscopy</td>
<td>Water nanostructures in glassware induced by HMs up to 200C.</td>
</tr>
<tr>
<td>Konovalov and Ryzhikina (2014, 2015) (87,94)</td>
<td>Dynamic light scattering, zeta potential, atomic force microscopy, microelectrophoresis, conductivity, ultraviolet and EPR spectroscopy</td>
<td>Nanoparticles detected at all potencies evaluated, including plant derived Lycopodium 6C, 30C, 200C, 1M, 10M, 50M, and CM potencies but not in 90% ethanol (alcohol) controls. NP sizes ranges from 12 nm to 832 nm with varying observations of agglomerates at 6C potency vs. many clusters at extremely high potencies. All verum samples were sonicated prior to evaluation.</td>
</tr>
<tr>
<td>Rajendran (2015a,b) (88,89)</td>
<td>Field emission scanning electron microscopy and energy dispersive spectroscopy</td>
<td>Nanoparticles detected at all potencies of iron metal-derived Ferrum metallicum medicines at 6C, 30C, 200C, and 1M potencies.</td>
</tr>
<tr>
<td>Bell et al. (2015a,b) (82,83)</td>
<td>Nanoparticle tracking analysis, transmission electron microscopy, zeta potential measurements, UV-vis spectroscopy</td>
<td>NPs in verum HMs at 6C, 30C, and 200C potencies with different sizes, zeta potentials, and concentrations compared with succussed and nonsuccussed controls.</td>
</tr>
<tr>
<td>Temgire et al. (2016) (90)</td>
<td>High resolution transmission electron microscopy, energy dispersive X-ray analysis, selected area electron diffraction pattern</td>
<td>Meso-microporous silicate coating layers observed around starting material NPs from morganic salts and metal source materials in homeopathically prepared medicines at 6C, 30C, 200C, and 1M potencies.</td>
</tr>
</tbody>
</table>

### Table 3. Summary of basic science findings reported in homeopathically-prepared medicines (HMs)

<table>
<thead>
<tr>
<th>Study</th>
<th>Technology</th>
<th>Homeopathically-prepared materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baumgartner, et al. (2015) (81)</td>
<td>Wheat seedling development in randomized sets of bulk form arsenic-treated seeds in plastic bags hung side by side, with verum (Arsenicum Album 4X) and placebo (water 45X; unpotentized water) bags in proximity to one another</td>
<td>Verum-treated seedlings showed inhibition of growth. Control water wheat shoot length was smaller as a function of spatial proximity to verum-treated seedlings. Possible field-like effect (distance-dependent).</td>
</tr>
<tr>
<td>Montagnier, et al. (2009, 2015) (30,31)</td>
<td>Serially diluted and succussed bacterial and viral DNA (DNA is a nanostructure)</td>
<td>Electromagnetic waves detected with low frequency patterns characteristic of the specific source bacteria. Recorded signals can induce nanostructures in water with the same DNA information as the original source pathogen. Quantum field effects hypothesized.</td>
</tr>
<tr>
<td>Rey (2003, 2007) (23,24)</td>
<td>Low-temperature thermoluminescence (freezing followed by irradiation and then gradual rewarming)</td>
<td>Measured thermoluminescence glow differs between verum HMs (2 different salt HMs vs unsuccussed controls).</td>
</tr>
<tr>
<td>Lenger, et al. (2008, 2013) (78,79)</td>
<td>Delayed luminescence (photon emission) as measured by coefficient B2 (low values for placebo pellets; high for verum pellets)</td>
<td>HMs from silver or plant source Cantharis at 100MK to 1000MK potencies previously dried on sucrose pellets could be differentiated.</td>
</tr>
<tr>
<td>Cartwright (2016) (80)</td>
<td>Solvatochromic dyes (involve electron transfer) vs non-solvatochromic dyes</td>
<td>Solvatochromic but not non-solvatochromic dyes detect presence of verum HMs.</td>
</tr>
</tbody>
</table>

HMs = homeopathically-prepared medicines  
NPs = nanoparticles

Research and Clinical Studies of Homeopathy in GI Diseases

Stress in laboratory animals can lead to mesenteric microvascular leakage and subsequent intestinal disorders. Administration of the combination homeopathic medicine Traumeel reduced the leakage of albumin in rats exposed to noise stress and

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significantly reduced mast cell degranulation compared to noise-exposed controls (109).

In another rodent experimental model, the effects of 3 separate homeopathic medications, *Belladonna*, *Gelsemium* and *Poumon histamine* at 3 different potencies (5C, 9C, and 15C) were evaluated for their effects including potential reduction in gastric erosions in stressed mice. Significant decreases in gastric erosions were found in mice treated with *Bell* 9C and with *Gels* and *P. histamine* at all doses (108).

The ovine helminth parasite *Haemonchus contortus* causes severe economic loss in tropical and subtropical regions, where resistance to all broad-spectrum anthelmintic drugs has been detected. One study on 20 lambs of both sexes showed that the homeopathic medicines *Ferrum phosphoricum* 6X and *Ars* 6X (PO qod x 10 days) followed by *Calcarea carbonica* 12X (PO BID x 10 days) resulted in a decrease in fecal egg count and a significant decrease in larva per gram of feces. In addition, the immune response as evidenced by higher leukocytes, eosinophils, IgG, and anti-*H. contortus* IgG was higher in the homeopathy group versus the conventionally-treated and control groups. Daily weight gain was also higher, resulting in a favorable cost-benefit analysis (110).

In a clinical trial on piglet coliform diarrhea, 52 sows were given either *Coli* 30C, a homeopathically-prepared medicine made from various strains of *E. coli*, or placebo. Five-hundred and twenty-five piglets in the placebo group rapidly infected each other, whereas disease did not spread in the *Coli* 30C treated group in which mostly only 1 piglet was affected (111).

Double-blinded clinical trials in children (ages 6 months to 5 years) with diarrhea were performed in Nicaragua (2 studies) and Nepal (1 study). Children were given either an individualized homeopathic medicine or placebo, and both groups were given oral rehydration therapy. The studies showed a decrease in the duration and number of stools in the homeopathically treated groups versus the placebo groups (112–115) [Table 3].

### Conclusion

Homeopathy is a time-tested system of medicine that offers safe, economical alternatives for the treatment of GI conditions in animals. This field of medicine was developed by empirical observation and the first Phase 1-type of clinical trials, the drug provings. A perception exists that modern medicine has replaced and outperformed previous forms of therapies. Moreover, early attempts at explaining how high dilutions of substances could yield biological effects concluded prematurely that homeopathic medicines were nothing more than inert placebos.

Advances in science are leading to an understanding of the structural and physico-chemical properties of the medicines and the effects of the medicines in biological systems. Clinical trials, although sparse, and practitioner experience show promise for reducing morbidity and mortality from GI conditions. While more research is needed to complement the existing research database, the safety and current understanding of efficacy of homeopathy medicines warrant its consideration in GI conditions refractory to conventional therapies and on organic farms in which standards require avoidance of bulk forms of conventional drug and chemical residues in meat and milk (116–118).
References


HRTEM and EDS studies of high dilutions of Ferrum metallicum 6, 2012;28(45):15864–15875.


emerging, and homeostatic danger signals. Implications for subjects, and spider monkeys.


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