The end of veterinary homeopathy

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Beginnings

Christian Friedrich Samuel Hahnemann was born in 1755 in Meissen, a town near Leipzig, Germany. His father, a porcelain painter, was influenced by the Enlightenment and strived for the best education for his children. He wanted his children to become *Selbstdenker* (self-thinkers). Samuel Hahnemann became an inquisitive student, who provided for himself as a translator. From his translations he acquired a vast knowledge, particularly of chemistry.[1]

Hahnemann studied medicine at Leipzig and Vienna, taking the degree of M.D. at Erlangen in 1779. From 1784 to 1789 the Hahnemann family lived in Dresden, where Samuel probably had a meeting with the visiting Lavoisier.[2] The famous French chemist might have stimulated Hahnemann to pursue his way in chemistry. Hahnemann earned a good reputation for himself by introducing a method to unmask sweetening of wine with lead and by publishing a report on arsenic poisoning. In 1789 Hahnemann left medical practice and concentrated on research and publishing. Between 1790 and 1805 he published a total of 5500 pages in books, articles and translations.

The *similia* theory

Hahnemann developed an aversion for the medical practice of the late 18th century, which employed bloodletting, leeching, purging and other procedures that did more harm than good. In his search for other approaches, Newtonian empiricism did not play an important role. Rather, his role model was the Renaissance astrologist Paracelsus, who pioneered the use of chemicals and minerals in medicine. Hahnemann always emphasised the empiric character of his method, but he had a strong passion for speculation and ontologic system building.[1]

Hahnemann translated William Cullen's *Lectures on the Materia Medica* into German, however, he was not convinced by the author's explanation of the beneficial effect of quinine in malaria patients. Cullen felt that quinine reinforced the stomach. Hahnemann took quinine himself and reportedly experienced symptoms similar to those of malaria, that is, similar to the symptoms of the disease that quinine was used to cure. This observation led him to assert the theory that 'likes are cured by likes', *similia similibus curentur*. Diseases are cured (or should be treated) by those drugs that produce in healthy persons symptoms similar to the diseases.[3] Hahnemann's chief work, *Organon der rationellen Heilkunst* (1810; Organon of rational medicine) contains an exposition of his system, which he called *Homöopathie*.[4] The term is derived from the Greek words *homoios* (similar) and *pathos* (suffering or disease).[1]

In order to prescribe accurately using Hahnemann's system, the symptomatology from the ingestion of various substances would have to be known. Accordingly, Hahnemann and his followers tested the effects of almost 100 substances on themselves, a process known as proving (from the German *Prüfung*). Materials tested included table salt (*natrum muriatum* – most homeopathic remedies are given Latin names), snake venom (*lachesis*), head lice (*pediculis capitis*), and poison ivy (*rhus toxicodendron*). Typically, a healthy person would ingest a small amount of a particular substance and then attempt to note, with meticulous detail, any reaction or symptom (including emotional or mental reactions) that occurred, and attribute those symptoms, no matter how trivial, to ingestion of the remedy. By this method, Hahnemann and his followers 'proved' that the substance was an effective remedy for a particular symptom. Lists of symptoms ran from 10 to 50 pages long for each substance, and included such effects as 'easily falls asleep when reading', 'excessive liability to become pregnant' and 'excessive trembling of the body, when dallying with females'. The collected experiences of such incidents became the basis for a compendium called the *Materia Medica*.[5]

From 1811 to 1821, Hahnemann lectured at the university of Leipzig on homeopathy. In 1821, the hostility of apothecaries forced him to leave Leipzig, and at the invitation of the duke of Anhalt-Köthen he went to live at Köthen. Fourteen years later he moved to Paris, where he practised medicine with great popularity until his death in 1843.

Potentiation

His basic rule, s*imilia similibus curentur*, established, Hahnemann next turned to drugs themselves. He compared the action of drugs with warmth, magnetism and electricity. He described the action of highly diluted solutions as 'dynamic'. Hahnemann realised that there was little or no chance that anything of the original substance would remain after these extreme dilutions. But he believed that the vigorous shaking or pulverising with each step of dilution, followed by rapping on a hard surface (Hahnemann preferred a leatherbound book) promoted the release of intrinsic curing forces. In Hahnemann's view these forces, thus freed from material bonds, can affect the organism effectively.[6]

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Over the years, Hahnemann tended to go for higher dilutions. In 1816 he recommended in *Reine Arzneimittellehre* dilutions up to C30 for most purposes, that is, a dilution by a factor of 100^{30} = 10^{60}. While some homeopaths used (and use) still higher dilutions, Hahnemann himself decried dilutions in excess of C30, saying 'there must be some end to the thing. It cannot go on to infinity'.[7] In recent years several of the available dilutions have been tested. From these studies there is no evidence that currently available homeopathic remedies can be distinguished from placebo solutions. Indeed, participants in several trials have been unable to distinguish between homeopathic solutions and placebos.[8–10]

Homeopathic decline

Homeopathic remedies gained some level of popularity during the 19th century, possibly because the remedies were actually less dangerous than those commonly used by orthodox practitioners. At the turn of the 20th century, homeopathy had about 14,000 practitioners and 22 schools in the United States. However, in the early 20th century, the use of homeopathic remedies declined sharply, as the field was unable to keep up with advances in medical science and education. Schools either closed or converted to modern methods. The last pure homeopathic school in the United States closed during the 1920s.[11]

Science and homeopathy

When considering a possible scientific basis for homeopathy, two questions have to be answered: (1) Is there any evidence of a likely mechanism? and (2) Have clinical trials demonstrated effects better than a placebo?

Mechanism

The dilution far beyond Avogadro's number (6×10^{23}) makes it very unlikely that one molecule of the original substance would be present in a C30 solution. Thus a pharmacological action based upon molecular interaction cannot be expected. What remains is the belief of homeopaths that these dilutions retain some 'essential property' (curing force) of the substance once present.

The most sensational attempt to prove the latter has been the study of Benveniste and co-workers on the effects of extremely diluted antibody solutions. They found that aqueous solutions of anti-immunoglobulin E (anti-IgE) still retain an ability to cause degranulation of human basophilic granulocytes, even when diluted to the point where there are no anti-IgE molecules left in the solution. The report was accepted for publication in *Nature*,[12] under the condition that identical results had to be obtained when the experiment was repeated in Benveniste's laboratory under the observation of a delegation composed by the editor-in-chief. When the experiment was repeated, the activation of basophils in tubes treated with the 'homeopathic diluted antigen' did not differ from that of the control tubes, which were only treated with the solvent. Also, in other laboratories Benveniste's claim of transmission of biological information to the molecular organisation of water could not be confirmed.[13]

Trials

In human medicine many randomised trials of varying quality have been performed, comparing homeopathic treatment with a placebo. In more recent years, the trials have been summarised in a number of meta-analyses.

The early meta-analyses were somewhat inconclusive. The authors of these reviews generally felt that their results could not exclude the possibility that individualised homeopathy had an effect over placebo.[14,15] However, the authors were also aware of the poor quality of many of the studies, and they added that the results of their analyses might have been coloured positively by publication bias (that is, a report with a positive result is more likely to be published than a report with a negative result). These considerations raised the concern that the effects of the homeopathic treatments may have been overestimated.[16]

In 2002, the Department of Complementary Medicine of the University of Exeter published an analysis of systematic reviews/meta-analyses.[17] The analysis failed to provide strong evidence in favour of homeopathy. In particular, there was no condition responding convincingly better to homeopathic treatment than to placebo or other control interventions. Similarly, there was no homeopathic remedy that was demonstrated to yield clinical effects that are convincingly different from placebo. The author concluded that the best clinical evidence for homeopathy available does not warrant positive recommendations for its use in clinical practice.

In 2005, investigators from Switzerland and the United Kingdom reported a comparative study of 110 homeopathic trials and 110 matched conventional medicine trials. Biases were present in placebo-controlled trials of both homeopathy and conventional medicine. When account was taken for these biases in the analysis, there was weak evidence for a specific effect of homeopathic remedies, but strong evidence for specific effects of conventional interventions. The authors conclude that this finding is compatible with the notion that the clinical effects of homeopathy are placebo effects.[18]

No such critical reviews of homeopathy appear to have been published in veterinary medicine. However, the few well designed trials in veterinary medicine have also failed to demonstrate efficacy of homeopathy, including for the treatment of calf diarrhoea,[19] somatic cell counts in milk,[20] bovine mastitis[21] and canine atopic dermatitis.[22]

Clinical experience

In spite of its absurd underpinnings and precipitous decline, after 200 years homeopathy is still practised by some physicians and veterinarians. Given the paucity of good scientific evidence supporting their effectiveness, the basis for such practice is undoubtedly a clinical impression of a positive effect, that is, clinical experience.

Several treatments are based upon no more than clinical experience, which is the uncontrolled conviction of the clinician that the treatment works. Some of the treatments fall into disuse after

some period of time, while others may persist for decades, or even centuries. Accordingly, an intriguing question is: how can ineffective treatments persist? There are at least four plausible explanations.[23,24]

Insufficient knowledge of the natural course of the disease
Even while employing a generally accepted treatment, a clinician may lose sight of the spontaneous course of the disease being treated. For example, in the past it was customary to treat idiopathic trigeminal neuropathy (canine dropped jaw syndrome) with corticosteroids. This was followed by a complete recovery in 2 to 3 weeks. Now it is known that the condition has an excellent prognosis without any treatment, and that corticosteroids do not alter its course.

Random variation
The clinician's experience is often based on a limited number of cases. As a result there is a risk that random chance will lead to overestimation of treatment effects. If, for example, four out of five cases are cured by a treatment, it cannot be expected that 80% of future patients will be cured. In fact, reliable statistical estimates of cure based on such a limited experience, which can be obtained from consultation with statistic tables for confidence intervals, will reveal that with 95% certainty the cure rate will be somewhere between 28 and 99%.

Placebo effects
Human patients seek medical advice expecting to be helped. This expectation, together with the 'healing environment' of the doctor's office, may bring about a positive placebo effect – at least a psychological one – no matter which treatment is given. However, whether such effects affect the outcome of disease is still a matter of debate.[25]

Of course, in animals the situation is different. While it is generally accepted that since animals do not know that they are being treated, they cannot experience a true placebo effect.[26] Studies in experimental animals and in clinical cases require the use of a placebo to control external factors (for example, other measures) and observer effects (owner and investigator).[27,28] In addition, in long term studies, there is the possibility of the development of Pavlovian conditioning.[29] However, given that the mere visit of a companion animal to an animal hospital is associated with stress,[30–32] no *a priori* beneficial effect for the animal should be expected. On the contrary, stress may have adverse effects on the course of the disease.[33]

The bias of the clinician
The clinician always hopes that the treatment will be effective and thereby becomes a prejudiced or biased observer. Like everyone, clinicians seek to bolster their egos. They are like supporters of a football club who say 'we won' when the team wins and 'they lost' when it loses. Clinicians have a tendency to ascribe success to the prescribed treatment, irrespective of whether the patient's improvement could have been spontaneous.

The end

Homeopathy has not withstood scientific testing.[34] In human medicine, at least one important medical journal now feels that for too long a politically correct laissez-faire attitude has existed towards homeopathy. Furthermore, the journal stated: 'Now doctors need to be bold and honest with their patients about homeopathy's lack of benefit'.[35] Spurred by such opinions, in the human field, things may be changing. For example in the United Kingdom a Parliamentary Committee has issued a report about complementary and alternative medicine, stating that 'any therapy that makes specific claims for being able to treat specific conditions should have evidence of being able to do this above and beyond the placebo effect'.[28] The Swiss Government has withdrawn insurance coverage for homeopathy and four other complementary treatments.

Similar efforts are advancing in veterinary medicine. For example, in November 2005 the Federation of Veterinarians in Europe (FVE) issued a strategy document including the statement that the veterinary profession is rooted in science and evidence-based veterinary medicine.[36] In the explanatory discussion of this strategy document it was explicitly stated that the FVE rejects non-evidence based medicines such as homeopathy.[37]

Earlier in 2005 the European Board of Veterinary Specialisation (EBVS) made a clear statement with regard to alternative modes of treatment: The EBVS only recognises scientific, evidence-based veterinary medicine complying with animal welfare legislation. Specialists or colleges practising or supporting implausible treatments with no proof of effectiveness run the risk of withdrawal of their specialist status. No credit points can be granted for education or training in these so-called supplementary, complementary and alternative modes of treatment.[38] In October 2006, the general assembly of the Royal Netherlands Veterinary Association agreed to discontinue the official status of the group of veterinarians working with homeopathy.

Epilogue

From a justifiable aversion to the medical procedures of his day, Samuel Hahnemann developed an alternative approach, his 'law of similars'. The notion that symptoms of disease can be cured by extremely small or non-existent amounts of substances that in large amounts produce similar symptoms in healthy individuals, has now been debated for about two centuries. The debate has entered the modern medical era. In addition to the absence of any mechanistic evidence, results of randomised trials summarised in meta-analyses have not provided evidence of effectiveness.

The curtain has fallen: homeopathy offers no clinical benefit. Medical professions are obliged to make this clear to the public. This holds true particularly for the veterinary profession, because in clinical veterinary medicine no benefit from an intrinsic placebo effect can be expected. Animals are entitled to effective treatments.

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