



RESPONSE

HOMEOPATHY IS UNSCIENTIFIC AND UNETHICAL

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ABSTRACT

In opposition to the premises of Against Homeopathy – a Utilitarian Perspective, all four respondents base their objections on the central claims that homeopathy is in fact scientifically plausible and is supported by empirical evidence. Despite ethical aspects forming the main thrust of Against Homeopathy, the respondents’ focus on scientific aspects represents sound strategy, since the ethical case against homeopathy would be weakened concomitant with the extent to which any plausibility for homeopathy could be demonstrated. The trouble here is that the respondents are attempting to perpetuate a sterile debate. The notion that homeopathic preparations could have any biological effects represents a fringe viewpoint, one not entertained by serious scientists nor supported by reason and evidence.

In the present article, I shall endeavour to explain why the respondents do not have a valid case. I will deal firstly with their general approach to scientific plausibility and evidence, and then consider some of the specific claims they have made. Finally, I will answer the philosophical arguments some of the respondents have raised.

HOMEOPATHIC THEORY IS IMPLAUSIBLE

In *Against Homeopathy*, I pointed out how astonishing it would be if homeopathic preparations had any direct biological effects, considering that the dilution process inherent in homeopathy makes it statistically unlikely that even one single molecule of the original ‘active’ substance will be present in most homeopathic doses. To deal with this fact, two competing explanations may be employed: either [a] homeopathic ‘medicines’ simply cannot have effects beyond placebo, and any claimed effects therefore ought to be attributed to observation errors or spurious ‘noise’ in experimental data; or [b] apparent homeopathic effects must be real and therefore the logico-scientific conclusion that absent molecules cannot produce biological effects ought to be rejected.

Explanation [a] is demanded on logical grounds; it is the simplest of the two explanations to fit the observed

data and, in contrast to explanation [b], does not require that fundamental rules of science and reason be overturned. However, it is clear that all four respondents subscribe to explanation [b], and this leads these authors into dubious territory.

Several of the respondents, in their letters in this issue and also in other published works, posit various complex models and claimed scientific phenomena to try to explain how homeopathic preparations may exert biological effects. However, these proffered explanations amount merely to *ad hoc* attempts to manoeuvre around the central problem: namely that it would be incredible to suppose that absent molecules could exert any effects at all. The authors deploy complex scientific concepts and elaborate terminology, including ‘systemic networks’, ‘complex information’, ‘neuro-immuno-endocrine homeodynamics’, ‘chaotic dynamics’, ‘energy field’ and ‘inductive-idiographic’; however, the posited hypotheses of homeopathic action have no scientific validity. I would

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assert that such use of authoritative-sounding concepts and terminology, with no underlying substance, represents a form of obfuscation and locates these homeopathic hypotheses firmly within the domain of pseudoscience.

THERE IS NO CREDIBLE EVIDENCE FOR HOMEOPATHY

A second approach employed by several of the respondents is to claim that published clinical evidence supports homeopathy. It is true that the published literature contains reports of apparently successful treatments with homeopathy. However, it is disingenuous to take such reports out of context. Clinical trials literature, by its inherent nature, contains a good deal of background 'noise', in terms of contradictory or anomalous publications, generated by a range of factors including chance statistical effects, low subject numbers, poor study design, slipshod execution, and even fraud.¹

Scientifically tenable theories generate increasingly clear and accurate observations over time. By contrast, invalid theories, where pursued, accumulate negative results interspersed with rare positive results. The latter pattern is displayed by the body of published work on homeopathy. Moreover, the isolated positive reports of homeopathy are generally inferior studies.² Regrettably, the existence of a few 'positive' publications has allowed biased reviewers to claim justification for homeopathy by cherry-picking isolated favourable studies, and ignoring their manifest weaknesses.

All of the papers cited by the respondents have previously been examined seriously and found to be wanting. Space does not permit each paper to be considered, however one example (cited by Richard Moskowitz) is representative:

D.S. Spence, E.A. Thompson, S.J. Barron. Homeopathic treatment for chronic disease: a 6-year, university-hospital outpatient observational study. *J Altern Comp Med* 2005; 11: 793–798.

This 'study' has no control group. It thus provides no evidence as to whether homeopathy works. This is regrettably typical of 'positive' homeopathy publications, and the fact that homeopaths cite such papers with regularity is good reason to believe that homeopaths have no interest in properly testing their ideas.

¹ J.P.A. Ioannidis. Why Most Published Research Findings are False. *PLoS Med* 2005; 2: 696–701.

² Reviewed in W.B. Jonas, et al. A Systematic Review of the Quality of Homeopathic Clinical Trials. *BMC Complement Altern Med* 2001; 1: 12. For an example of a specific case see K.L. Overall & A.E. Dunham. Homeopathy and the Curse of the Scientific Method. *Vet J* 2009; 180: 141–148.

Some of the respondents' claims are remarkably strong and unequivocal, given the lack of persuasive supporting evidence available. For example, Lionel Milgrom and Kate Chatfield claim that 'homeopathy is impressive in the treatment of animals, newborn babies and comatose patients'. In fact, aside from isolated and flawed reports, there exists no good evidence for such claimed homeopathic effects.

Citation of isolated 'positive' publications represents very poor academic practice. Moreover, due to the risk of seriously misleading non-specialists (e.g. patients) as to the efficacy of homeopathy, I would argue that such practice is unethical.

DUBIOUS HOMEOPATHIC CLAIMS

I have no desire to appear to lend credence to a scientific 'debate' which in fact does not exist as far as serious scientists are concerned. However, the respondents have committed to print several specific assertions in opposition to *Against Homeopathy* that are based on serious scientific fallacies or misunderstandings. Thus, in the following sections, I highlight and repudiate the key offending claims.

Misplaced appeals to pharmacology

Several of the respondents claim that the existence of 'non-linear' dose-response relationships lends support to homeopathy. Bell-shaped dose response curves are well-known in pharmacology: very high concentrations of a drug may block ion channels, or become toxic in some way, such that the response declines. In a few cases the mechanism is well understood. However, this phenomenon has nothing to do with homeopathy, as it occurs only with large doses. Homeopaths maintain that dose response curves have a negative slope, but in 200 years they have failed to produce a single example of such a curve. It is pharmacologically untenable to claim that the smaller the dose the bigger the effect.

More specifically, Irene Sebastian and Richard Moskowitz cite the idea of 'hormesis' to justify homeopathy. Hormesis refers to instances where a substance is toxic at high dose but beneficial at low dose. (The term itself is not used in serious pharmacology, and simply describes rather trite occurrences: for example, vitamin A is essential for health but overdosing on vitamin A supplements may lead to liver damage; similarly, water is essential for health but grossly excessive intake leads to water intoxication.) The fact that the homeopathic dilution process removes all molecules of the original active substance renders hormesis (and all non-linear pharmacological effects) irrelevant to homeopathy. Regardless of the nature of the dose-response curve of the original substance, no molecules equals no effect.

Homeopathic ‘similitude’ – an empty concept

Sebastian defends the concept of ‘similitude’, a fundamental tenet of homeopathy. This concept, otherwise known as the ‘law of similars’, maintains that substances that produce particular symptoms can cure the same symptoms. The general idea appears to hold intuitive appeal for many; indeed it predates homeopathy considerably.³ However, there are no logical grounds for believing that ‘like treats like’, and the concept is not supported by basic empirical research. Furthermore, the principle of homeopathic similitude is simply a category mistake: it cannot be applied to modern medicine. The principle was conceived 200 years ago when it was unknown that disease exists in fundamentally different forms, each caused by a specific malfunction of a tissue or an organ. In light of this knowledge, we now know that diseases cannot be treated according to a common rule such as ‘similitude’. The only correct therapy for an illness is according to its very specific etiology and pathogenesis.

Laboratory experiments do not support homeopathy

Richard Moskowitz and Paolo Bellavite make reference to various studies dealing with high dilutions showing that the solvent exhibits unexpected physicochemical properties. There is no space here to deal with each of the cited publications separately. These papers appear to be single disconnected studies, some of them having the obvious aim of giving scientific credibility to homeopathy. Extrapolating from these findings to conclude that homeopathy has a scientific basis is unwarranted and unconvincing. There is of course a parallel here between such laboratory experiments and clinical trials, in terms of cherry-picking isolated positive findings.

The history of science contains many instances where surprising experimental results have led to established theory being overturned. However, it is important to recognise the extent to which fundamental scientific theory would have to be revised in order to accommodate a mechanistic basis for homeopathy. Simple arithmetic shows that to receive just one molecule of the diluted agent from a fairly standard homeopathic dilution of 1×10^{30} , the patient would have to consume over 30,000 litres of the homeopathic solution. And many homeopathic medicines are diluted to even greater extremes, ranging up to 1×10^{400} , meaning that to receive just one molecule of agent the patient would have to consume more matter than is present within the entire

universe. Thus, for homeopathic dilutions to have mechanistic effects, it would appear necessary to reject virtually all that science has painstakingly elucidated over the last 200 years concerning the composition of matter itself.

The only logical way that homeopaths have found to deal with this epistemic problem is to employ the *ad hoc* notion that the solvent used for dilution retains a ‘molecular memory’ of the original substance. This explanation is implicit in many of the experiments alluded to by Moskowitz and Bellavite. However, the idea that water (or any other solvent, such as alcohol) has a ‘memory’ is unsubstantiated by any laws or mechanisms known to science. Claims that the special form of shaking (‘succussion’)⁴ employed during the dilution process somehow ‘potentises’ the solvent to ‘memorise’ the original molecular structure are similarly unfounded. Moreover, homeopathic medicines are frequently taken as pills. These sugar pills are prepared by the addition of a drop of the ultra-diluted solution, which then dries out. Thus, for homeopathic pills to have any activity, it would be necessary for the ‘memory’ of the long-since-vanished molecules to be transferred from the water onto the sugar pill. Again, neither physics nor chemistry provides any support whatsoever for such a mechanism. Finally, the ‘memory’ must pass into the patient’s body and exert physiological or biochemical effects: biological science offers no explanations as to how such ‘information’ could possibly alter bodily functions.

Fortunately, one does not have to be a physicist, chemist or biologist in order to cut through the pseudo-scientific jargon and understand the implausibility of claims for a homeopathic ‘memory’ effect. If it were true that water can ‘remember’, then simple logic indicates then every substance ever encountered by a molecule of water – such as biological toxins or heavy metals – should be expected to imprint a ‘memory’ that would exert powerful and unpredictable effects on the body. The fact that physiological chaos does not ensue whenever we drink a glass of water provides a simple but powerful refutation of the ‘memory’ concept in homeopathy.

PHILOSOPHICAL ARGUMENTS

As pointed out above, the respondents’ main approach has been to claim scientific credibility for homeopathy. However, some of the respondents also make claims of a philosophical nature, including those of direct ethical relevance.

³ Hippocrates mentioned the notion ‘like treats like’, and it was advocated by the Swiss physician and mystic Paracelsus, who predated homeopathy by about a century (Paracelsus was apparently influential on Hahnemann, the 19th century founder of homeopathy).

⁴ The process of ‘succussion’ varies amongst homeopaths: Hahnemann recommended that the solutions simply be rapped against a hard leather book between dilutions.

Scientism?

Moskowitz claims that *Against Homeopathy* is an example of 'scientism encroaching into medicine', defining 'scientism' as 'the unscientific belief that compared to other forms of knowledge, science is the absolute and only justifiable access to truth'. In response, I suggest that questions of medical efficacy – for all treatments, whether mainstream or 'alternative' – properly reside in the domain of science. This seems axiomatically correct, and places the onus on Moskowitz to establish grounds for rejecting the use of scientific methodology in the context of medicine. Moreover, this letter contradicts itself. Its initial lines defend homeopathy on grounds of 'compelling scientific evidence', thus acknowledging the central importance of science in medicine. The application of scientific methodology to medical questions is entirely warranted and does not constitute 'scientism'.

Moskowitz claims that 'scientism' of the sort allegedly displayed in *Against Homeopathy* may lead to certain outcomes, including 'the campaign to undemocratically rid Britain's NHS of its homeopathy/CAM facilities' and 'all current medical procedures being postponed while awaiting proof of efficacy'. In the case of the former outcome, there is nothing 'undemocratic' about campaigning against the expenditure of scarce public resources on unproven and implausible forms of medicine. While Moskowitz views such campaigning as ethically problematic, I suggest that such an outcome instead ought to be welcomed, on the ethical grounds set out in *Against Homeopathy*. With regards to the alleged postponement of all medical procedures, I agree that this outcome would be extremely negative. However, such an outcome does not flow from the proper use of scientific methodology in medicine. Acceptance of the efficacy of a drug or procedure does not depend on absolute proof, but on general agreement that efficacy has been reasonably well demonstrated through quality clinical trials.

More fundamentally, the notion of 'scientism' as employed by Moskowitz is questionable. This is revealed in part by certain references cited in his letter. In particular:

D. Holmes, S.J. Murray, A. Perron, G. Rail. Deconstructing the evidence-based discourse in health sciences: Truth, power, and fascism. *Internat J Evid Based Healthc* 2006; 4: 180.

This paper makes repeated use of the term 'fascism' when referring to any rational approach to medical evidence. Such outrageous language (which led to immediate notoriety for the paper concerned)⁵ reveals an approach that appears to be extremely biased against science.

⁵ <http://www.dscience.net/?p=37> [Accessed 2 Aug 2011].

The use of ill-defined and derogatory terms such as 'scientism' and 'fascism' only serves to lower the quality of the discussion surrounding the ethics of homeopathy.

Unethical users?

Irene Sebastian claims that 'most users of homeopathic medicines are in fact also proponents', and from this concludes that I am denouncing on ethical grounds all such persons. These users/proponents are claimed by the respondent to number some 200 million worldwide, and specifically to include Mahatma Gandhi.

Sebastian offers no evidence for these claims, either in terms of the numbers or the notion that most users are also proponents. Regarding the latter claim, it seems likely that very many of those who use homeopathy will simply be seeking improvements in their health, as opposed to behaving as 'proponents' of homeopathy.

In *Against Homeopathy* I argued that personal decisions in respect of homeopathy are not entirely ethically neutral, and concluded that there exists 'at least a modest duty on individual citizens to reject homeopathy' (on the grounds that this would maximise personal health and avoid giving unwarranted credence to ineffective medicine). It is thus a distortion – and somewhat absurd – to suggest, as Sebastian does, that my arguments imply that users of homeopathy (including Gandhi) should be labelled as 'unethical' persons.

Moreover, the modest duty on individual citizens to reject homeopathy only applies where those concerned possess reliable knowledge about homeopathy. In this respect, it is the prescribers and (true) proponents of homeopathy who carry the lion's share of ethical responsibility. By prescribing ineffective medicine and promulgating falsehoods about homeopathic efficacy, it is these advocates, as opposed to the users of homeopathy, who are guilty of serious unethical behaviour.

CONCLUDING REMARKS

The respondents base the broad thrust of their objections to *Against Homeopathy* on the claims that homeopathy is scientifically plausible and supported by experimental evidence. I suggest that they have manifestly failed to substantiate these claims.

Irving Langmuir used the term 'pathological science' to describe the process of pseudoscientific investigation into long-discredited phenomena.⁶ Examples include

⁶ Langmuir I. Pathological Science. *Phys Today* 1989; 42(10): 36–48.

'research' into astrology, extrasensory perception (ESP), and flying saucers. In pathological science, the process is driven by self-delusion. I suggest that homeopathy fits well with this description.

Given that homeopathy cannot work and does not work, I suggest that my original utilitarian analysis of homeopathy remains valid. Homeopathy is ethically unacceptable and ought to be actively rejected by health-care professionals.

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