the treatment of hypertension. Data was collected at the National Academy of Homoeopathy, India (NAHI) located in Nagpur, Maharashtra. Cases diagnosed and treated for hypertension in 2013 under the outpatient department affiliated to Shaad Homoeopathic Hospital Complex & Research Centre were assessed for eligibility, classified and analyzed. A total of 41 subjects were selected and classified into homeopathy group (N = 22) or integrated group (N = 19) according to the treatment they received. Statistical results with repeated measures ANOVA suggest that there is no significant difference between the homeopathy and the integrated group in terms of blood pressure reduction at week six of treatment. It is concluded that homeopathy on its own is as efficacious as homeopathy plus conventional pharmacotherapy in the treatment of hypertension.

Keywords: Hypertension, Homeopathy, Integrated treatment

Different approaches in homeopathic basic research: plant-based bioassays and evaporation-induced crystallization

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Two different approaches can be adopted in fundamental research in homeopathy to evaluate the effectiveness of homeopathic preparations: i) plant-based bioassays and ii) evaporation-induced crystallization. As concerns i), the classic test of wheat germination and growth has been quoted as a basic model for research on homeopathic potencies. Results of our experimentations showed that As_2O_3 45x (As 45x) induced a significant increase of germination rate and stalk growth with respect to control. This simple model was used also to study the following aspects:

- effect of temperature: results show that As 45x heated at 20°, 40° and 70°C induced a significant increase of germination rate vs. control, losing its effectiveness at 100°C
- effect of aging-time: As 45x always induced a stimulating effect on germination, significant only after three months from treatment preparation
- effect of succussion number: a significant increase of germination was obtained starting from 32 succussions between each dilution step for As 45x
- effect of serial dynamizations (from 5x to 60x): data showed an oscillatory trend, with some potencies inducing a significant decrease (35x), while others a significant increase of germination rate (5x, 30x, 40x, 45x, 55x, 60x)
- effect on gene expression profiles: a massive reduction of gene expression levels to values comparable to those of the control group, induced by As 45x, was observed for several functional classes of genes.

The second approach sought to verify whether the droplet evaporation method (DEM) can be applied to assess the effectiveness of homeopathic remedies. We studied the shape characteristics of the polycrystalline structures formed during droplet evaporation of wheat seed leakages. The results showed that As 45x increased the local connected fractal dimension levels and bilateral symmetry exactness values in the polycrystalline structures, as compared to the water treatment.

Keywords: Plant-based bioassays, Droplet evaporation method, Wheat seeds, Arsenic trioxide 45x

Replication of specific effects of a *Stannum metallicum* 30x preparation in a cress seedling/ biocrystallization test system

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One of the aims of basic homeopathic research is to reveal any specific mode of action of potentized preparations. This requires stable and reliable preclinical tests measuring either specific physicochemical properties or biological effects of homeopathic preparations.

Within a precursor project, we developed a bio-assay which yielded highly significant evidence for specific effects of an ultra-molecular *Stannum metallicum* 30x preparation relative to *Water* 30x, based on 15 independent randomized and blinded experiments performed at two independent laboratories. The test system is based on cress seed germination, biocrystallization and subsequent computerised image analysis of the biocrystallization patterns. The biocrystallization method is based on the phenomenon that self-organizing, additive-specific crystallization patterns emerge when a $CuCl_2.2H_2O$ solution with additives is crystallized on a glass plate. The method acts as an indicator for systemic properties of the applied additive.

In the present project we investigated the reproducibility of the effects found in repeated experiments based on improved methodology towards: (i) optimization of the laboratory procedures to avoid any processing order effects, (ii) full implementation of blinded systematic negative control (SNC) experiments, and (iii) *Water* 30x was

replaced by *Lactose* 30x to control for the trituration of *Stannum metallicum*. In total 10 + 10 independent randomized, coded experiments were performed in two independent laboratories. In addition, 10 + 10 SNCs were performed to control experimental stability.

Meta-analysis of the data revealed the same data structure in both projects, i.e. a reproduction of the significant differences between the two homeopathic preparations. The SNCs showed no significant intra-day, inter-day or inter-lab differences, indicative of a robust and reproducible test system.

We were thus able to establish a test system yielding reproducible biological effects of an ultra-molecular homeopathic preparation. These ground-breaking results point to a promising potential of the method to contribute to basic homeopathic research.

Keywords: Bio-assay, Systemic properties, *Stannum metallicum* 30x, Systematic negative control experiments, Reproducible effects

The role of the research ethics committee in providing ethical approval for provings. The findings from a pilot study

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Background: Provings are a considered to be a cornerstone of homeopathic practice. Stuart Close notes how Hahnemann 'instituted "provings" of drugs upon himself, members of his family, friends, students and fellow practitioners, keeping all under the most rigid scrutiny and control, and carefully recording every fact and the conditions under which it was elicited'. This situation has remained constant over the years, with the majority of provings being conducted in the many homeopathy schools and colleges. Whilst the methodology employed in carrying out provings has developed over the last two decades, they have not generally been subject to a process of ethical review.

Aims: The presentation will commence with an examination of the ethical issues inherent in provings, before moving on to an analysis of the results and experience of taking a proving to a research ethics committee for ethical approval. The presenter, who is Chair of a Research Ethics Committee, will share the issues encountered and solutions found along the way, and will discuss the experience of both the research ethics committee and the proving organisers. The project offers an insight into how provings could be conducted in a way that is both congruent with the values of the profession and meet the requirements of research in the twenty-first century.

Keywords: Provings, Research ethics committee, Homeopathy

Repetitions of fundamental research models for homeopathically prepared dilutions beyond 10^{-23}: a bibliometric study

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Introduction: Repeatability of experiments is an important criterion of modern research and a major challenge for homeopathic basic research. In 2010 we presented an overview about basic research studies in high homeopathic potencies that have been subjected to laboratory-internal, multicenter or independent repetition trials. This overview was now updated.

Methods: We considered biochemical, immunological, botanical, cell biological and zoological studies on high potencies, i.e. beyond a dilution of 10^{-23}. Main sources of information were reviews, personal contact with members of the homeopathic basic research community, and the MEDLINE and HOMBREX databases. Studies were extracted from the publications and grouped into models. Studies were further sorted according to repetition type (laboratory-internal, multicenter, or independent) and results achieved.

Results: In 2010, a total of 107 studies have been found. From these, 30 were initial studies. In the attempt to reproduce one of these initial studies, 53 follow up studies yielded comparable effects (35 laboratory-internal, 8 multicenter, 10 independent repetitions), eight studies showed a consistent, yet different result from the initial study (2 laboratory-internal, 2 multicenter, 4 independent repetitions), and 16 studies yielded zero effects (5 laboratory-internal, 2 multicenter, 9 independent repetitions). When all repetitive studies are considered, 69% reported effects comparable to that of the initial study, 10% different effects, and 21% zero effects. Independently performed repetition studies reported 44% comparable effects, 17% different effects, and 39% zero effects. The update brought to the forth further studies, with approximately the same distribution regarding the categories.

Conclusions: We identified more than 20 experimental models in basic research on high homeopathic potencies, which were repeatedly investigated. Most of these were reproduced with comparable results, about ¼ were also reproduced with different results, and other repetitions showed no results for more than half of the models. We encourage further repetition trials of published studies, in order to learn more about the model systems used and in order to test their repeatability.