

adopted, for the dilutions 2c and 9c, an RT-PCR Array approach (SABioscience, Qiagen) containing 84 genes, including receptors and regulators of neuronal function. In this further investigation we observed a trend to down-regulation for DRD2, CHRN4B, CHRNG, PROKR2 and PHOX2A genes in 2c and BRS3, GRPR genes in 9c dilution. In particular the down-regulation of DRD2 and PROKR2, effective in the inhibition of Gabaergic neurotransmission, suggests a specific effect of *Gelsemium s.* in increasing the endogenous GABA activity. Overall, the genes modulated in this experimental model outline new working hypotheses on the anxiolytic and analgesic action of this plant. In conclusion this study provides evidence that *Gelsemium s.* exerts a prevalently inhibitory effect on a series of genes, in particular involved in G-protein coupled transduction systems, in olfactory transduction, in calcium signaling and in neurotransmission. Furthermore the whole genome expression analysis (microarray and real-time PCR), indicates that the “omics” molecular biology is a suitable approach to study the effects of highly diluted natural compounds.

## In-vitro experiments to investigate the effects of homeopathic drugs for chronic aggressive periodontitis by lymphocyte migration activity

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**Background:** Several homeopathic drugs are applied in the treatment of periodontal inflammation. However less is known about the basic working principles of highly diluted remedies in such chronic inflammatory conditions. We therefore aimed at investigating the effects of homeopathic drugs in periodontal inflammation by observing lymphocyte migration activity.

**Material and Methods:** Lymphocytes from blood samples of three patients suffering on chronic aggressive periodontitis and three matched healthy volunteers were extracted and embedded in a collagen matrix migration assays together with highly diluted (D12 and C200) aqueous extract from *Mercurius solubilis*, *Silicea*, *Sulfur*, *Tuberculinum*, or placebo. Activity and speed of lymphocytes were observed in a 60 min time frame using flow cytometry. Statistical analysis was performed using univariate statistics and SiZer time series analysis.

**Results:** A significantly reduced migration activity and speed was observed in lymphocytes extracted from the patients suffering on chronic aggressive periodontitis compared to those of healthy volunteers (mean activity: 12.5% vs. 26.3%). While C-potencies did not reveal strong differences between placebo and substances some meaningful effects were observed in D-potencies compared with placebo: moderate but not significant inhibiting effects with regards to activity were observed in lymphocytes treated with *Silicea* extract (mean activity: 13.3% vs. 11.9% in patients' and 26.2% vs. 22.2% in healthy samples). The strongest and most specific effects were observed in Sulphur D12 which showed an activating effect in lymphocytes of patients (mean activity: 11,1% vs. 23,8%) but not in those of healthy volunteers (25,8% vs. 25,6%). SiZer analysis confirmed this effect to be significant.

**Conclusion:** Discussion about the basic working principles of highly diluted substances is still vital and leads to controversies in the scientific discussion. Although conclusions are limited due to low sample size, our pilot study was able to reproduce former results on lymphocyte migration activity and thus proves model validity. Results from our pilot study might encourage further investigations on the role of highly diluted Sulphur in the treatment of periodontitis.

## Use of homeopathy for prophylaxis of urinary tract infections in patients with neurogenic bladder dysfunction

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**Background:** Patients with neurogenic bladder dysfunction are prone to various urologic disorders which sometimes cannot be appropriately treated. Especially recurrent urinary tract infections (UTI) in patients with spinal cord injury are a frequent clinical problem. Often, conventional preventive measures are not successful. We present our initial results of collaboration between homeopaths and urologists in these patients.

**Materials and Methods:** after exclusion of morphologic abnormalities and initiation of a standard regime for prophylaxis, all patients with a neurogenic lower urinary tract dysfunction (NLUTD) due to spinal cord injury (SCI) with more than 3 symptomatic UTI/year were offered additional homeopathic care (classical homeopathy with an individualized approach). UTI symptoms were fever, incontinence, increased spasticity, decreased bladder capacity or pain/

decreased general health combined with significant bacteriuria.

**Results:** Five of seven patients opted for homeopathic treatment. The bacterial strains detected in urinalysis were *E. coli*, *proteus mirabilis* and *Klebsiella pneumoniae*, respectively. Morphologic and functional reasons for recurrent UTI were excluded by sonography, cystoscopy and urodynamics. After treatment, with a median follow-up of 15 months, 3 of these patients remained free of UTI, whereas UTI frequency was reduced in the other 2 patients. In three patients, standard prophylactic treatment could be reduced. No side effects were encountered.

**Conclusion:** Our initial experience with homeopathic prevention of UTI is encouraging. Keys for a fruitful cooperation are well-qualified partners, mutual respect and the motivation to cooperate closely. For an evidence-based evaluation of this concept, prospective studies are required.

## Homeopathy in the public health system: the experience in Lucca Hospital (1998-2011)

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The Homeopathic Clinic in Lucca, funded by the Region of Tuscany, was originally set up in 1998 as part of a pilot project designed to evaluate the possibility of including complementary medicine (CM) into the public health care system.

The following are the main activities in the field of clinics, research and education carried out in these years.

**Outcome:** The data have been updated with those collected from September 1998 to December 2010: 2,592 patients visited for a total of 6,812 consecutive visits. The results were assessed using the Glasgow Homeopathic Hospital Outcome Score (GHHOS).

**Paediatric patients:** An observational longitudinal study was carried out on 551 paediatric patients below or equal to the age of 14 years (mean age 5.9 years), that is 25.7% of 2,141 patients consecutively examined from 1998 to 2008.

**Adverse effects:** In order to assess the possible risk arising from the use of homeopathy a prospective study was carried out to investigate the adverse drug reactions related to homeopathic medicines. Out of 335 homeopathic consecutive follow-up visits, nine adverse reactions were reported (2.68%).

**Clinical risk management:** A training course for the health professionals of Tuscan public centres of CM, including homeopathy, was conducted. The aim was to develop a plan for the management of clinical risk starting from the analysis of the activities in the clinics of CM, and a systematic approach aiming at identifying and preventing risks.

**Homeopathic aggravation:** To evaluate the type, intensity and frequency of homeopathic aggravation, in particular with Quintamillesimal dilutions (LM or Q), and its prognostic value, a retrospective study was realized on the basis of clinical data. The study examines 1,108 patients consecutively visited, and 441 cases with follow-up. Sixty-three of them (14%) reported a homeopathic aggravation.

**Compliance:** In order to understand why the patients did not return for follow-up consultations (drop-out) a telephone survey was carried out on each patient visited from 6/1,2002 to 5/31, 2003, who did not return for a follow-up visit. 37 patients out of 73 referred to the effectiveness of the treatment and the improvement in their state of health as the reason why they did not return.

**Long term outcome of atopic patients:** To study the outcome of atopic diseases (AD) in paediatric patients homeopathically treated and the clinical evolution of 213 (38.6%) with atopic diseases out of 551 children consecutively examined from 1998 to 2008. After 5 years from the first visit, all the children were contacted for long-term evaluation of the disease.

**Anti-cancer treatment:** An outpatient Clinic of integrative medicine applied to oncology was set up in October 2010. In the preliminary stage of activities, 97 patients were visited, with various types of cancer.

**Cost-benefit evaluation:** A study of the Homeopathic Clinic of Lucca demonstrated cost/effectiveness of homeopathy in respiratory diseases. Cost variation for the specific chemical/therapeutic subgroup recorded a decrease in the first and second year of  $-46.29\%$  ( $p < 0.01$ ,  $n = 105$ ) and  $-47.45\%$  ( $n = 72$ ) respectively.

All these data demonstrate the validity of the integration carried out in Tuscany and the need to strengthen and consolidate the activities of complementary medicine in public healthcare structures.

## Will this medicine work for me? Towards a scientific answer

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Which answer would you prefer: 1. "This medicine works better than a placebo", or: 2. "I estimate the chance that this medicine will work in your case to be 60%"?

These two answers reflect a two and a half century lasting dispute between two statistical methods, 'classical' (frequentist) and Bayesian. The first is regarded to be more scientific, the latter played a major part in solving many of history's most important problems, like deciphering coded messages in WO II and predicting disasters. Nowadays many computer programs incorporate Bayes' theorem to handle experiential knowledge.

Because RCT evidence does not allow other conclusions, the patient can only expect a yes-or-no statement