

An overview of research at University of Kalyani in exploring some basic issues of Homoeopathy

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Abstract

Homoeopathy has been confronted with certain major issues such as (i) how is medicinal property of homoeopathic drug transferred to and retained by the vehicle; (ii) how can it act in biological system in the absence of any original drug substance in ultra high diluted remedies? and (iii) plausible mechanism and pathways of biological action including mysteries of 'like cured by likes'. We demonstrated through controlled studies the ability of ultra-highly diluted homoeopathic drugs in rendering protection/repair of cytogenetic damages inflicted by whole-body X-irradiation in mammalian model mice *in vivo*. We examined cytogenetic damages in arsenic, cadmium, mercury and stannum intoxicated mice and their remediation by homoeopathic drugs derived from agitated ultra-high dilutions of their respective salt, deploying many scientific protocols. We made a human trial on efficacy of *Arsenicum album* against groundwater arsenic-contaminated victims. We tested efficacy of some homoeopathic remedies in cancer of mice and thalassemia in human. We produced nano-capsules of homoeopathic mother tinctures and their bioactive components and induced nano-precipitation of silver from silver nitrate by homoeopathic mother tinctures and characterised them for their physicochemical properties and biological action. We studied tissue distribution of nanoparticles, precise mechanism and pathways of their action that involved certain signal proteins and their pathways, both *in vivo* and *in vitro*. This approach made a significant contribution towards elucidating the role of drug nanoparticles in inducing 'memory of water' and mechanism and pathways of action of homoeopathic remedies through epigenetic modifications that supported 'gene regulatory hypothesis'.

Keywords: Gene regulatory hypothesis, Memory of water, Nano-capsules, Nanoparticles

INTRODUCTION

Acceptability of Homoeopathy is mainly challenged when the ultra-high dilutions at or above 12C (diluted 10^{-24} or higher) of remedy are used, because at these dilutions, the remedies are unlikely to contain even a single molecule of the original drug substance, and therefore, their efficacy as medicine becomes an object of suspicion. Non-believers/rationalists argue that the reported clinical effects of such highly diluted remedies may only be 'placebo' or 'psychosomatic effects'. Major questions asked are as follows: (i) Whether it is possible to transfer medicinal property to water or aquatic ethanol (vehicle) by homoeopathic method of serial dilutions with agitations, and if it is, how can it be accomplished? (ii) How can these ultra-highly diluted remedies bring about spectacular physiological changes when these are administered to patients in absolutely micro-doses? (iii) If the remedies can really have remedial effects, then what could be the precise

mechanism of their biological action? Our works are mostly related to answering questions 'ii and iii' though they also have bearing on understanding the issue raised in 'i' as well, to some extent. And finally, since homoeopathic practitioners treat patient's symptoms in totality including mind – symptoms in human, based on the dictum 'like cures like', the mystery of similia and mind–body relationships associated with this kind of remedy must also be scientifically addressed.

Our early works

Our initial research works were focussed on proving efficacy of ultra-highly diluted homoeopathic drugs in mammalian model mice (*Mus musculus*) which have the closest similarity

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in regard to human genome, maintaining suitable controls. In all such experiments, we diluted the homoeopathic remedies with double distilled water in such a way that the alcohol concentration of the vehicle of the drug always was brought down to <1% to avoid any known alcohol effect on cells and the 'control' alcohol ('placebo') was also diluted to the same extent for a proper comparison of the actual drug effect.

X-RAY-INDUCED CYTOGENETICAL EFFECTS AND THEIR MODULATIONS BY POTENTISED HOMOEOPATHIC DRUGS

Chromosomes house DNA, the genetic material that controls all metabolic, enzymatic and other physiological activities of all living organisms except for a few, where RNA is the genetic material. Therefore, any damage to DNA is detrimental and needs immediate action for its protection/repair. A well-established and efficient intrinsic mechanism to protect/repair DNA/chromosomes has already been known. Hence, we wanted to see if micro-doses of ultra-highly diluted homoeopathic drugs could demonstrate their ability to influence the genomic repair mechanism. X-ray exposure to animal causes quantifiable chromosome damages for each dose as manifested by aberrations of different types. We conducted controlled experimental studies for testing ability of several potentised remedies against X-ray-induced genotoxic/cytogenetical/enzymatic damages in mice *in vivo*.^[1-6] It was observed that multiple cytogenetical end-points such as chromosomal aberrations, micro-nucleated erythrocytes, sperm head anomaly and mitotic indices of mice (*M. musculus*), exposed to whole-body X-irradiation in sub-lethal doses, could be favourably modulated by administration of a potentised homoeopathic drug, *Arnica montana*, commonly used against shock and injury, as compared to that of several well-maintained controls. The drug-fed X-irradiated mice clearly showed lesser amount of chromosomal damage compared to that of succussed alcohol (placebo)-fed, diluted alcohol-fed and water-fed controls. Thus, *Arnica montana* 30C appeared to show protective effect against cytogenetical damage (including repair of DNA damage) induced by whole-body X-irradiation in mice. Mice-fed *Arnica* 30C both pre- and post-irradiation showed the best protective effect, followed by only post- and pre-fed mice, in that order. Subsequently, similar works were carried out more extensively in X-irradiated mice with some other ultra-highly diluted drugs used against shock and injury, such as *Hypericum* 30C, *Ruta graveolens* 30C, *X-ray* 30C and *Ginseng* 30C and 200C, which also showed anti-radiation effects in experimental mice as compared to succussed alcohol-fed controls. Thus, the homoeopathic drugs demonstrated their ability to trigger the repair process of chromosome/DNA damage, for which the 'repair genes' must have been involved.

The 'gene regulatory hypothesis' was first presented by this author in the All India Congress of Cytology and Genetics held in 1993 at Berhampur University, Orissa, the proceedings of which was published in 1995,^[7] and later, in a slightly

modified form in a British Medical Journal in 1997,^[8] mainly based on our findings on anti-radiation efficacy of some potentised homoeopathic drugs. Subsequently, *Arnica montana* 30C also appeared to protect sonication-induced cytogenetical damages in mice; however, when actinomycin D, a transcription blocker, was used alongside the homoeopathic drug in mice, the ameliorating effects of the homoeopathic drug were apparently absent.^[9] Repair of DNA in mice is known to be regulated and performed by the concerted effort of certain genes (such as XP-A, B, C, D, E and F in mammals) and without active involvement of these repair genes, a complete repair of damaged DNA is not possible. *Arnica montana* 30C also showed its protective effect in bacteria *Escherichia coli* subjected to ultraviolet (UV)-irradiation and interestingly enough showed the expected over-expression of the concerned repair genes Uvr A, Uvr B and Uvr C in the drug-fed series; however, no such changes in expression level of the repair genes were observed in the succussed alcohol 30C fed control.^[10] Similarly genes regulating entry and expulsion of arsenic in bacteria *E. coli* were also found to be favourably modulated by administration of *Arsenicum album* 30C.^[11]

TESTING HOMOEOPATHY FOR ENZYMATIC MODULATIONS

We tested efficacy of several potentised homoeopathic remedies in protecting against cytogenetic damage inflicted by some toxic chemicals on the basis of isopathic principle, treating toxicity effects of different toxic chemicals with ultra-high dilutions of the same toxic substance, as per the homeopathic doctrine 'like cures like' taking not only cytogenetical parameters but also some other scientifically accepted parameters such as enzymatic and non-enzymatic proteins and other relevant genotoxic protocols.^[12-23] Cytogenetical endpoints as well as certain toxicity biomarkers such as acid phosphatase (AcP) and alkaline phosphatase (AlkP), alanine amino transferase (ALT) and aspartate amino transferase (AST), lipid peroxidation and reduced glutathione were considered. Incidentally, modulation of physiological action as manifested in protein biomarkers essentially will need change in transcription signals which are under direct control of specific genes or part of DNA.

AMELIORATION OF ARSENIC TOXICITY IN MICE AND HUMAN WITH POTENTISED *ARSENICUM ALBUM*

Administration of a potentised homeopathic remedy, *Arsenicum album* 30C, positively modulated various parameters of toxicity in arsenic-intoxicated experimental mice vis-à-vis proper control.^[12-23] Results of a pilot human trial followed by a more extensive trial involving nearly 200 people living in a few high-risk groundwater arsenic-contaminated villages revealed that *Arsenicum album* 30C and 200C could show signs of amelioration in respect of a large number of scientific protocols and toxicity biomarkers of arsenicosis, such as arsenic contents in urine and blood (nail and hair of a few), ALT, AST, AcP and AlkP, antinuclear antibody titre and haematological parameters.^[24-27] Arsenic content

of urine and blood decreased significantly along with other positive ameliorative changes in 'verum'-fed subjects. Even signs/symptoms of arsenicosis were minimised or disappeared after treatment for a few months. Subsequently, a millesimal potency *Arsenicum album* 0/3 also appeared to show benefits in the recovery process from arsenicosis.^[28] The toxicity biomarkers included various liver enzymes, antioxidants and stress markers, which are under regulation of specific genes. Arsenic intoxication is known to disrupt synthesis/functioning of as many as 200 enzymes, which are again under genetic control. Thus, amelioration in enzymatic activities towards normal would speak for the drug's influence on regulation of expression of numerous relevant enzyme-regulating genes. Subsequently, both *Arsenicum album* 30C and 200C were also found to ameliorate genotoxicity/clastogenicity induced by repeated injections of arsenic trioxide in mice, the latter potency showing marginally better ameliorative potential. Not only in human but also in mammalian animal model (mice), *Arsenicum album* 30C also demonstrated its ability to modulate protein biomarkers and gene expressions in the unicellular budding yeast, *Saccharomyces cerevisiae* (a member of primitive unicellular eukaryote) exposed to arsenate.^[29] *Arsenicum album* 6C also protected sodium arsenite-induced apoptosis in *S. cerevisiae*.^[30] Interestingly, homoeopathically prepared glucose 30C demonstrated its capability to increase glucose uptake through over-expression of permease gene and *Ars A* gene (enhancing ATPase activity for expulsion of arsenic) in arsenite-stressed bacteria *E. coli*, a member of the unicellular prokaryote group, while administration of *Arsenicum album* 30C induced over-expression of *Ars B* and *C* genes^[31] (for arsenic tolerance and pumping out of arsenic), the placebo-treated *E. coli* failed to elicit such results. In another interesting and pioneering study, capability to modulate gene expression and to target the genes (DNA) for synthesising altered transcriptome by potentised homoeopathic drugs could also be evidenced by a novel phage (virus) bacteria infectivity experiment.^[32] Thus, ultra-high dilutions of *Arsenicum album* could produce ameliorating effects in both higher and lower eukaryotes as well as in prokaryotes. These results are significant in many ways. First, *E. coli* with a very simple genetic system could respond to potentised ultra-high dilutions in a positive manner, which would mean that the homoeopathic remedies can somehow have direct influence on genetic system and many hypotheses that implicate nervous system as an essential part of the mechanism become redundant in these lower organisms. Second, the bacterium could recognise between glucose 30C and *Arsenicum album* 30C which produced differential expression of certain relevant target genes; this again would speak for its support for the gene regulatory hypothesis. Indeed, similar ameliorative results were also obtained in *S. cerevisiae* in response to arsenic insult and treatment with *Arsenicum album* 30C,^[29] and here too, the succussed alcohol 30C (control) failed to elicit any positive response, thereby lending support for the 'molecular imprint' hypothesis of the homeopathic drug that makes it different in action from the chemically alike 'succussed alcohol'.

AMELIORATION OF THALASSEMIA PATIENTS ON HYDROXYUREA TREATMENT

Thalassemia is a disease essentially caused by gene mutations (haemoglobinopathy). A human trial consisting of some 38 thalassaemic patients who had been on hydroxyurea treatment for varying periods of time, but their improvement having stopped or declined (as revealed from data of various blood parameters such as ferritin level, haemoglobin level and status of enlargement of spleen/liver, etc.) was undertaken to examine if supportive treatment with certain potentised homoeopathic drugs could bring improvement in their health condition, particularly in respect of some haematological parameters.^[33,34] Administration of *Ceanothus*, *Pulsatilla* and *Ferrum metallicum* not only positively modulated blood picture in respect of ferritin and haemoglobin levels and decrease in size of spleen and liver of the 'verum'-fed subjects but also improved their mental state dramatically.^[34] All children became more energetic and cheerful after receiving homoeopathic remedies as supportive care, speaking for the ameliorative effect of the drugs on 'mental state' of patients even with genetic deficiencies.

HOMOEOPATHIC DRUGS AND THEIR BIOACTIVE INGREDIENTS IN CANCER CELLS *IN VIVO* AND *IN VITRO*: NANO-FORMULATION AND NANO-PRECIPITATION

Certain homoeopathic drugs, both in low and high dilutions and in their nano-encapsulated forms, have been reported to have anticancer/anti-hepatotoxic effects by us, both in mice^[35-54] and rats^[55-58] *in vivo* and in various cancer cells *in vitro*.^[59-91] Among these, several studies were conducted involving both *in vivo* and *in vitro* conditions that yielded similar results in both conditions, and mice proved to be an excellent mammalian animal model for conducting *in vivo* studies,^[92,93] even for providing evidence for expression of repair genes after UV-irradiation,^[94] or hyperglycaemia-regulatory genes.^[95,96] Cancer is a multi-step multi-gene process, generally initiated by mutation and transformation of proto-oncogene to oncogene. The entire process of carcinogenesis involves a large number of metabolic changes strictly under control of certain genes; regulation of these genes goes faulty, leading to transformation of cells. The transformed cells then attain immortalisation and are characterised by uncontrolled cell division and growth, with faulty expression of certain genes including the signal transducing genes. The dividing cells subsequently attain ability to move out from its original location to invade other surrounding tissue (metastasis). Most of these cancer cells are also capable of skipping cell death signals (apoptosis). Therefore, one way of determining anti-cancer potential of a drug rests on its ability to kill cancer cells either by apoptosis or necrosis. We have provided convincing evidence of modulation of relevant signal proteins triggered by certain homeopathic drugs and their active ingredients while in all these cases, corresponding 'placebo

controls' failed to elicit such positive signal responses. Favourable modulation of expression of aryl hydrocarbon receptor (Ahr receptor) has also been demonstrated in drug-fed DMBA-induced skin cancer mice, while the placebo failed to bring about such changes.^[47] Modulation of expression of genes occurred at both mRNA and protein levels so was true for expression of matrix metalloproteinases genes associated with metastasis of cancer. Results from immunofluorescence, western blot, real-time polymerase chain reaction and electron microscopic studies supported effects at both histopathological and molecular levels. We utilised accepted protocols for nano-encapsulating dried extracts of homoeopathic mother tinctures of several homoeopathic drugs such as *Gelsemium sempervirens*, *Polygala senaga* and *Peumus boldus* and thus produced actual poly (D, L-lactic-co-glycolic) acid loaded nanoparticles of these drugs in the acceptable nano-range sizes (about 100 nm or so) for drug delivery and compared their biological effects on cancer cells *in vivo* and *in vitro* with that of their respective unencapsulated mother tincture extracts and 'blank' controls.^[74] We found that at a much reduced dose, the formulated nano-encapsulated medicines acted much faster and more effectively and in a target-specific manner as compared to their crude forms or mother tinctures, which can provide analogy to the action of mother tinctures versus potentised forms of a homeopathic remedy. Interestingly, nanoparticles of original drug substances have recently been reported to exist in ultra-high dilutions of homoeopathic remedies although their actual role or mode of action could not be understood. Thus, our study on deliberate nano-encapsulation of homoeopathic drugs and their bioactive ingredients and revelation of their pathways of action and signalling mechanism, distribution in different tissues and ability to cross blood-brain barriers are some significant findings which can serve as a link with the findings of nanoparticles in high dilutions of homoeopathic remedies. The nanoparticles observed in high dilutions are claimed to be produced during the dynamisation process while we consciously produced them with a scientifically accepted protocol and characterised them physicochemically with most modern techniques such as atomic force, scanning and transmission electron microscopies and dynamic light scattering and by utilising several firmly established biological protocols. Some of the bioactive ingredients isolated from mother tinctures and their nano-encapsulated forms have also been reported to have stronger anticancer effects by us subsequently. Thus, these results have implications on the homoeopathic doctrine 'more diluted, stronger the action of drugs'. Further, some of these nanoparticles had some role in changing ultra-structural orientation of water molecules carrying specific 'information bits' as suggested in the well-known 'memory of water' concept. These nanoparticles could also interact with DNA-producing conformational changes required for epigenetic modifications.^[97-102] To our knowledge, this happens to be the first approach to implicate ability of potentised homoeopathic drugs to interact with genome affecting possible change in transcriptome to initiate the recovery process of a disease, which led to the discovery

of some personalised homoeopathic remedies by potentiating specific segments of DNA bearing some specific genes.^[103,104]

STUDIES ON EPIGENETIC MODIFICATIONS AND ON GLOBAL MICROARRAY OF GENES

DNA microarrays are widely used to measure expression levels of large numbers of genes simultaneously, with the aid of selective probes under highly stringent conditions, for monitoring expression levels to study the effects of certain treatments, for example, to identify genes whose expression is changed in response to pathogens or drugs. In our recent studies,^[99-102] we conducted microarray analysis in regard to modulating capability of *Hydrastis canadensis* 30C and *Condurango* 30C, two homoeopathic remedies known to have anti-cancer effects from clinical studies, against placebo control. Expression profiles of certain genes of the drug-treated HeLa cells *in vitro* were significantly different from that of the placebo-treated cells. This suggests that drugs and placebo differed in their ability to trigger gene responses, particularly those implicated in cancer.

Epigenetic modifications are the hallmarks of cancer. We demonstrated^[97,99,101] that homeopathic drugs could modulate epigenetic modifications in cancer cells *in vivo* and *in vitro*. They influenced DNA methylation-demethylation and histone acetylation/deacetylation favourably for regulating gene expressions.

CONCLUDING REMARKS

Experimental results support that potentised homeopathic drugs, though devoid of any original drug molecule, were still capable of acting favourably in a multidirectional manner, by triggering a gene/set of gene(s) ('master' genes), followed by a cascade of downstream gene actions responsible for the recovery process. However, how this was precisely accomplished in higher complex organisms still needs further in-depth research. In our experiments involving both bacteria and bacteriophages containing simple genetic systems, certain genes of interest were very clearly modulated by potentised homoeopathic drugs (30C), confirming that some homeopathic remedies had anti-viral effect and could have direct influences on the genetic system.

Further studies are warranted to learn more precisely if nanoparticles of the drugs have a key role in transferring information to water/aquatic ethanol molecules presumably by their ability of modulating their sub-molecular architecture. On the basis of all evidences available, the gene regulatory hypothesis offers an acceptable logical explanation of the molecular mechanism involved in biological action of the ultra-highly diluted homeopathic remedies in all living organisms, plants and animals, possibly by triggering processes of epigenetic modifications through methylation/demethylation of DNA and acetylation/deacetylation of histone, which are an integral part of the epigenetic modification route. However,

further works are necessary to elucidate as to how the remedies may carry specific 'signals' or 'molecular imprints' of drug that can be identified by specific receptors of the cells as a trigger to turn 'on' or 'off' some relevant genes, initiating a cascade of gene actions to alter and correct the gene expressions that might have gone wrong during development and production of the pathological disorder/disease. Currently, it appears that homeopathic medicines could manipulate the signalling mechanism in a bid to reverse/rectify signals towards initiating recovery process on the road.^[47]

Regulation of gene expression is a very complex phenomenon in the higher eukaryotes such as mammals, during this process, the roles of 'activators', 'enhancers', 'gene-silencing' and phosphorylation/dephosphorylation have to be more clearly assessed to understand the actual molecular mechanisms involved in transmission of 'information' of the homeopathic remedy down to the 'execution' level for initiation and completion of disease recovery process. Each signal may be communicated to a particular gene by a separate activator (signal recognition particle). Signals are often communicated to transcriptional regulators through signal transduction pathways. However, how a homeopathic medicine diluted beyond Avogadro's limit can elicit response in a cell receptor and bind with the receptor (that is, ligand role) is not yet precisely known although we have shown in one experiment that *Secale cornutum* 30C could activate Ahr receptor which needs ligand-activation to function.^[47] More precise role of nanoparticles in Homeopathy has also to be further studied although we have put in quite extensive data on record to suggest their possible role in biological action and put forward a significant step to link up the findings of nanoparticles in ultra-high dilutions of homeopathic remedies and their possible biological function, mechanism and pathways of action.

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Conflicts of interest

None declared.

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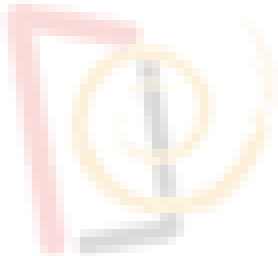
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कल्याणी विश्वविद्यालय में होम्योपैथी के कुछ मौलिक मामलों की खोज पर अनुसंधान का एक अवलोकन

सार

वर्तमान समय में होम्योपैथी का सामना कुछ प्रमुख मुद्दों से हो रहा है जैसे— (क) कैसे होम्योपैथिक औषधि के औषधीय गुण माध्यम में हस्तांतरित होते हैं और कैसे माध्यम द्वारा इन गुणों को प्रतिधारित किया जाता है। (ख) अल्ट्रा-हाइली डार्कल्यूटेड रेमेडीज (उपचार) में किसी भी मूल औषधीय पदार्थ की अनुपस्थिति में, यह जैविक प्रणालियों में कैसे कार्य कर सकता है और (ग) जैविक क्रियाओं की क्रिया विधि और मार्ग की वैज्ञानिक व्याख्या की कमी, जिसमें 'समः समम्: शमयति' और 'मन-शरीर संवाद' जैसे रहस्य शामिल हैं। हमने जीवित स्तनधारी मॉडल चूहों में पूरे शरीर के एक्स-विकिरण द्वारा प्रदत्त साइटोजेनेटिक नुकसान की रक्षा/ठीक करने में अल्ट्रा-हाइली डार्कल्यूटेड होम्योपैथिक औषधियों की क्षमता का नियंत्रित अध्ययन के माध्यम से प्रदर्शन किया। हमने आर्सेनिक, कैडमियम, मरक्युरी (पारा) और स्टेनलम से प्रभावित चूहों में साइटोजेनेटिक नुकसान की जांच की तथा कई वैज्ञानिक प्रोटोकॉल का उपयोग कर उनसे संबंधित साल्ट से उत्तेजित अल्ट्रा-हाइडार्कल्यूटेड से प्राप्त होम्योपैथिक औषधियों द्वारा उनका उपचार किया। आर्सेनिक-दूषित भूजल से पीड़ित लोगों के विरुद्ध आर्सेनिकम एल्बम की प्रभावकारिता पर एक मानव परीक्षण किया व मनुष्यों में थैलेसीमिया और चूहों में कैंसर में कुछ होम्योपैथिक उपचारों की प्रभावकारिता का परीक्षण किया। हमने होम्योपैथिक मदर टिंचर्स और उनके जैव सक्रिय (बायोएक्टिव) घटकों से नैनो कैप्सूल का निर्माण किया और सिल्वर नाइट्रेट से होम्योपैथिक मदर टिंचर्स द्वारा सिल्वर की नैनो-प्रेसीपिटेशन को प्रेरित किया और उन्हें उनके भौतिक गुणों और जैविक क्रियाओं के लिए चित्रित किया। हमने नैनो कणों के ऊतक वितरण, सटीक तंत्र और उनकी क्रिया के मार्गों का अध्ययन किया है जिसमें इनविट्रो और इनविट्रो, दोनों में कुछ संकेत (सिग्नल) प्रोटीनों और उनके मार्ग शामिल हैं। इस दृष्टिकोण ने 'जल की स्मृति' और तंत्र को उत्प्रेरित करने में औषध नैनो कणों की भूमिका तथा एपीजेनेटिक संशोधनों के माध्यम से होम्योपैथिक उपचार की कार्रवाई के मार्ग जो हमारे 'जीन नियामक परिकल्पना' का समर्थन करते हैं, को स्पष्ट करने में महत्वपूर्ण योगदान दिया।



Ein Überblick über die Forschung an der Universität von Kalyani bei der Erforschung einige grundlegende Fragen der Homöopathie

Abstrakt

Die Homöopathie wird mit bestimmten wichtigen Hauptfragen konfrontiert: i) Wie wird die arzneiliche Eigenschaft des homöopathischen Mittels auf das Vehikel übertragen und aufgenommen; ii) wie kann eine hochgradig verdünnte Arznei ohne ursprüngliche Arzneimittelsubstanz in einem biologischen Systemen wirken; und iii) ehrende wissenschaftliche Erklärung des biologischen Wirkungsmechanismus, einschließlich der Mysterien von "Ähnliches wird durch Ähnliches geheilt" und "Körper-Psyche-Interaktion".

Wir haben mittels kontrollierter Untersuchungen das Potenzial hochgradig verdünnter homöopathischer Arzneien zum Schutz/Reparatur von zytogenetischen Schäden, hervorgerufen durch eine Ganzkörper-Röntgenbestrahlung im Säugetier-Mäuse-Modell in vivo gezeigt. Wir untersuchten zytogenetische Schäden bei Mäusen, die mit Arsen, Cadmi-um, Quecksilber und Zinn vergiftet worden sind, und deren Sanierung durch homöopa-thische Arzneimittel, die aus verschüttelten ultra-hohen Verdünnungen ihres jeweiligen Salzes gewonnen worden sind und bei vielen wissenschaftlichen Untersuchungen eing-esetzt wurden. Wir haben eine Studie zur Wirksamkeit von Arsenicum album an Menschen, die von arsenhaltigem Grundwasser verseuchten worden sind, durchgeführt. Wir testeten die Wirksamkeit einiger homöopathischer Mittel bei Krebserkrankungen von Mäusen und Thalassämie beim Menschen. Wir produzierten Nano-Kapseln homöopathischer Urtinkturen und deren bioaktiven Komponenten, induzierten die Nano-Präzipitation von Silber aus Silbernitrat durch homöopathische Urtinkturen und charakterisierten ihre physikalisch-chemischen Eigenschaften sowie ihre biologische Wirkung. Wir untersuchten die Verteilung von Nanopartikeln, deren präzisen Mechanismus und ihre Wirkungsweise, die bestimmte Signalproteine und deren Wirkungsweise involvierten, sowohl in vivo als auch in vitro. Dieser Ansatz hat einen bedeutenden Beitrag zur Aufklärung der Rolle von arzneilichen Nanopartikeln bei der Induktion von "Gedächtnis des Wassers" und dem Mechanismus und der Wirkungsweise homöopathischer Arzneimittel über epigenetische Modifikationen, die unsere "Genregulationshypothese" unterstützt haben, geleistet.

Una visión general de la investigación en la Universidad de Kalyani en la exploración algunas cuestiones básicas de la homeopatía

Resumen

La homeopatía se ha visto confrontada a determinados planteamientos importantes: i) ¿de qué forma se transmiten las propiedades medicinales del medicamento al vehículo y cómo puede éste retenerlas?; ii) en ausencia de cualquier sustancia farmacológica original en las ultradiluciones de los medicamentos, ¿cómo es posible que siga actuando en los sistemas biológicos? y iii) la falta de elucidación científica del mecanismo y de las vías de la acción biológica, incluyendo los misterios de “lo similar puede curar lo similar” y de la “interacción mente-cuerpo”. A través de estudios controlados, hemos demostrado la capacidad de los medicamentos homeopáticos a altas diluciones de ofrecer una protección / reparación de las lesiones citogenéticas que la radiación corporal total provoca en el modelo mamífero de ratones in vivo. Hemos examinado las lesiones citogenéticas en ratones intoxicados con arsénico, cadmio, mercurio y estaño, y su resolución con medicamentos homeopáticos derivados de las ultradiluciones de las correspondientes sales, aplicando muchos protocolos científicos. Hemos realizado un ensayo humano sobre la eficacia de *Arsenicum album* víctimas contaminadas por arsénico a través de las aguas freáticas. Hemos investigado la eficacia de algunos medicamentos homeopáticos en el cáncer de ratones y en la talasemia del ser humano. Hemos confeccionado nanocápsulas de tinturas madre homeopáticas y sus componentes bioactivos, y hemos inducido la nanoprecipitación de la plata a partir del nitrato de plata mediante tinturas madre homeopáticas que después se caracterizaron en cuanto a sus propiedades físico químicas y a su acción biológica. Hemos estudiado la distribución de las nanopartículas, el mecanismo preciso y las vías que implican determinadas proteínas de señalización y sus vías, tanto *in vivo* como *in vitro*. Este enfoque ha proporcionado datos significativos para elucidar el papel de las nanopartículas medicamentosas en inducir la “memoria del agua”, así como el mecanismo y las vías de acción de los medicamentos homeopáticos a través de modificaciones epigenéticas que apoyan nuestra “hipótesis de regulación genética”.



Un aperçu de la recherche à l'Université de Kalyani en explorant Quelques problèmes fondamentaux de l'homéopathie

Résumé

L'homéopathie a été confrontée à certaines questions majeures telles que (i) comment la propriété médicale du médicament homéopathique est-elle transférée au véhicule et retenue par celui-ci ; (ii) en l'absence de toute substance médicamenteuse originale dans des remèdes ultra-dilués, comment peut-elle agir dans les systèmes biologiques et (iii) le manque d'élucidation scientifique du mécanisme et des voies de l'action biologique, y compris les mystères tels que « les semblables se guérissent par les semblables » et 'l'interaction esprit-corps'. Par le biais des études contrôlées, nous avons démontré la capacité des médicaments homéopathiques ultra-dilués à protéger/réparer les dommages cytogénétiques infligés par l'irradiation-X du corps entier chez les souris modèles mammaliennes in vivo. Nous avons examiné les dommages cytogénétiques chez les souris intoxiquées par l'arsenic, le cadmium, le mercure et l'étain et leur remédiation à l'aide des médicaments homéopathiques dérivés de dilutions agitées ultra-élevées de leur sel respectif, en déployant de nombreux protocoles scientifiques. Nous avons effectué un essai humain sur l'efficacité d'*Arsenicum Album* chez les victimes contaminées par l'arsenic des eaux souterraines. Nous avons testé l'efficacité de certains remèdes homéopathiques dans le cas du cancer chez les souris et de la thalassémie chez l'homme. Nous avons produit des nano-capsules de teintures-mères homéopathiques et de leurs composants bioactifs et avons induit une nano-précipitation de l'argent à partir du nitrate d'argent par des teintures-mères homéopathiques et les avons caractérisées selon leurs propriétés physico-chimiques et leur action biologique. Nous avons étudié à la fois in vivo et in vitro la distribution tissulaire des nanoparticules, les mécanismes précis et les voies de leur action qui impliquaient certaines protéines de signalisation et leurs voies. Cette approche a apporté une contribution significative à l'élucidation du rôle des nanoparticules médicamenteuses dans l'induction de 'la mémoire de l'eau', le mécanisme et les voies d'action des remèdes homéopathiques à travers les modifications épigénétiques qui ont soutenu notre 'hypothèse de régulation des gènes'.

卡利亞尼大學探索研究概況 順勢療法的一些基本問題

摘要

順勢療法要面對一些重大問題： i) 順勢療法藥物藥用特性如何透過載體轉移或保留； ii) 極度稀釋療劑沒有任何原來的藥物物質，它是如何在生物系統中起作用； iii) 缺乏生物作用機制和途徑的科學解釋，包括「相似者能治癒」和「身心相互作用」的奧秘。通過對照研究，我們證明在小鼠體內動物模型內，極度稀釋的順勢療法藥物可以對全身照射X光所造成的細胞遺傳學損傷有保護／修復的作用。我們研究了白砷、鎘、汞和錫中毒白鼠的細胞遺傳學損傷，以及服用了順勢療法藥物（即由其相應礦物鹽加能的極度稀釋療劑）後的修復作用，當中使用了許多科學性的研究方案。我們就白砷對飲用受白砷污染地下水受害者的療效之影響進行了人體試驗。我們測試了一些順勢療法療劑在治療患癌老鼠和人類地中海貧血的療效。我們生產了順勢療法母酊以及他們的生物活性成份的納米膠囊，亦通過順勢療法母酊的方式，由硝酸銀誘導銀的納米沉澱，得出其物理化學和生物作用的性質。我們研究了納米顆粒的組織分佈、其精確的機制和它們作用的途徑，它們的作用涉及某些信號蛋白及其途徑，包括體內和體外。這種方法對闡明藥物納米粒子在「水記憶」中的角色作出了重大的貢獻，而且支持了我們「基因調控假設」的表觀遺傳學，有助闡明順勢療法療劑的機制和途徑。

