



**Good Practice in Traditional Chinese Medicine Research in
the Post-genomic Era**

GP-TCM

223154

D8.7

**Final report on functional genomics studies of
acupuncture and moxibustion**



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1. THE WP8 FINAL REPORT

This GP-TCM work package on acupuncture and moxibustion (WP8) has finished all the activities and planned deliverables expected from the project. This report includes a summary of science/ technology/omics contributions and the work performed in this “WP8 final report”.

1.1. Project objectives:

The overall objective of this work package was to optimise and standardise acupuncture protocols and discuss the application of the functional genomics approach to examine the efficacy of acupuncture and moxibustion for the treatment of common diseases in the EU countries and to understand and interpret the nature of acupoints. Several specific objectives were outlined as follows.

- To establish a communication and collaboration platform to evaluate the current status of acupuncture research and practice in both China and EU.
- To define prioritised research areas or topic in acupuncture that are appropriate for conducting functional genomic studies
- To achieve general agreement or common standard for acupuncture protocols and effect determinations.
- To focus future research strategies within appropriate areas for functional genomics

1.2. Human resources and team assembly of WP8

1.2.1 Human resources

All WP8 members committed their dedication to the project to ensure the deliverables were completed on time and with high quality. The recruitment of internal or external experts in specific areas was continuous throughout the process.

For the ease of efficient communication and the better use the expertise of the participants, we formulated three parallel teams with balanced resources geographically based on the primary appointments of the experts, as seen in Table 1. Each team of professionals focussed on three aspects, acupuncture-moxibustion clinical practice, basic research in acupuncture-moxibustion, and functional genomic analyses with modern technologies.

Table 1: Provisional team composition

| | Western team (W) | Southern team (S) | Northern team (N) |
|----------------------|---|---|--|
| Chief | Dan Jiang* | Huangan Wu*+ | Xiaomin Wang+ |
| Participants | George Lewith*+ Alex Molassiotis Nicola Robinson* | Peter Hylands# Wolfgang Schwarz+ Wei Ding # | Linpeng Wang* Wei Ding # Quan Min Zhu+ |
| Host location | Sheffield, UK | Shanghai, China | Beijing, China |

Notes:

i) The focused responsibilities in scientific reviews of the experts are indicated by different symbols.

* clinical practice of acupuncture-moxibustion

+ basic research in acupuncture-moxibustion

functional genomics and its application in acupuncture-moxibustion

ii) Some members were assigned with more than one responsibility based on the fact that a strong multi-disciplined team already existed under his/her leadership, e.g. Huangan Wu*+ and his team in moxibustion research and clinics.

iii) To improve the communication between each team, some experts were assigned to participate in the tasks of more than one team, e.g. Dr. Wei Ding in both the Northern and Southern team.

iv) All three teams worked together having support from WP6 experts and from other WP Coordinators. Clinical epidemiologists and statistical experts were used for the analyses of the survey results of WP8 and WP6.

WP8 work plan and the organization of corresponding team tasks

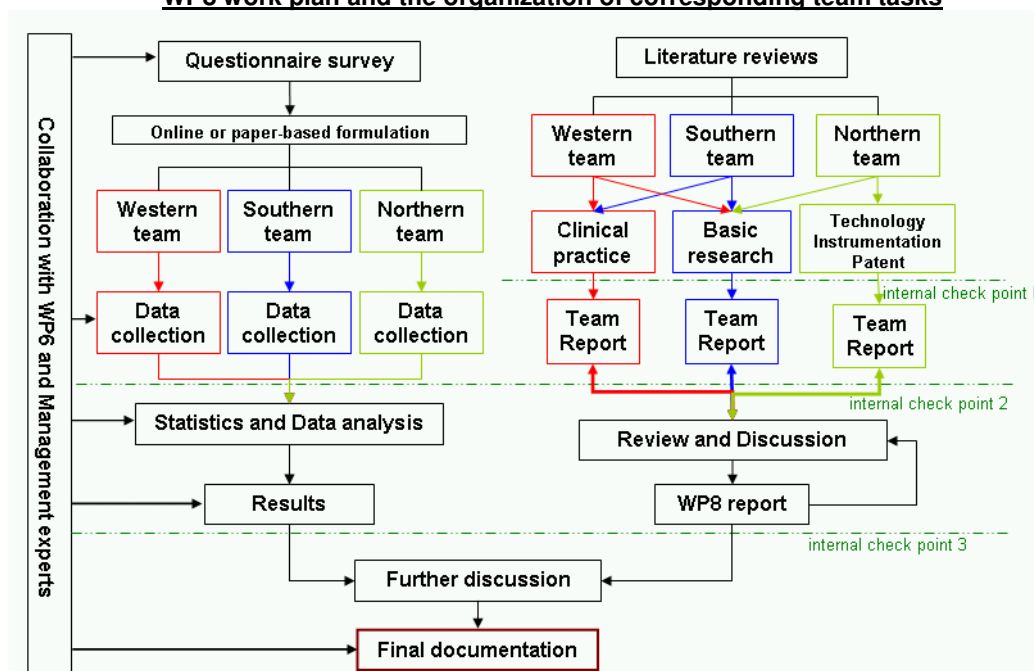


Figure 1. Diagram of WP8 general work plan

1.2.2 Team change of WP8

During the first year of the project, the beneficiary members of WP8 members located in China identified the need to consider co-ordination of the work package to include an English speaking EU member. This was felt to be important in order to overcome any language barriers and to ensure broader networking to include wider stakeholder members. This was accomplished in summer 2010 when Prof. Nicola Robinson, based at London South Bank University accepted the role of co-coordinator of WP8.

1.2.3 WP8 membership

Co-Coordinators: Prof. Xiao-Min Wang (China)* and Prof. Nicola Robinson (UK)

Beneficiary members: Prof. Huang Wu (Deputy Coordinator, China), Prof. Wei Ding (Assistant Coordinator, China), Prof. George Lewith (UK), Ms. Dan Jiang, Doctor of TCM (UK), Prof. Peter Hylands (UK), Dr. Jun Jia (Local Coordinator Assistant, China), Dr. Ava Lorenc (UK).

Non-beneficiary members: Prof. Quan Min Zhu (University of the West England, UK), Prof. Linpeng Wang (Beijing Hospital of Chinese Medicine, China Capital Medical University, China), Prof. Wolfgang Schwarz (Max Planck Institute for Biophysics, Germany), Dr. Daqing Ma (Imperial College London, UK), Prof. Claudia M. Witt (Charité University Medical Center, Germany), Dr. Giovanna M. Franconi (CTO Hospital and Tor Vergata University, Italy), Dr. Luigi Manni (Institute of Neurobiology and Molecular Medicine, Italian National Research



Council (CNR), Italy), Prof. Elisabet Stener-Victorin (University of Gothenburg, Sweden), Dr. Iosif Mezei (Transylvanian Association of Integrated Quantum Medicine, Romania), Mr. Mark Bovey (British Acupuncture Council, UK), Prof. Henry J. Greten (Heidelberg School of Chinese Medicine, Germany), Prof. Vivian Wong (University of Hong Kong, China), Dr. Karen Pilkington (the University of Westminster, UK), Dr. Kah Tong Seow (Wei Medicine, Germany), Prof. Gerhard Litscher (Medical University of Graz, Austria), Dr. Eric Ziea (Hospital Authority of Hong Kong, China), Dr. Xing Liao (China Academy of Chinese Medical Sciences, China), Dr. Christine Nardini (Chinese Academy of Sciences, China), Prof. Peter Illes (Universität Leipzig, Germany), Dr. Roland Salchow (HanseMerkur Center for TCM at the University Medical Center Hamburg Eppendorf, Germany), Dr. Sven Schröder (HanseMerkur Center for TCM at the University Medical Center Hamburg Eppendorf, Germany) .

1.3. WP8 Work Progress summary and Deliverables and Achievements

1.3.1 WP8 Overview:

The expert panel of WP8 has changed and expanded over the time period, but WP8 has maintained a close relationship with the Coordination Office (CO), the Standard Operating Protocol (SOP) and all Panel members. According to the deliverable schedule, WP8 successfully held the kickoff-meeting, commenced webpage construction and maintenance, piloted the electronic questionnaire survey in EU and China, developed period reports and attended the GP-TCM annual meeting and e-MSM teleconferences, carried out literature reviews and other published articles, and allocated work to related personnel. Throughout all the project duration, regular telephone and email communications were further supported by frequent teleconferences and other face-to-face meetings within WP8 members and external experts. Extensive GP-TCM related activities were also carried out to enhance the influence of GP-TCM.

1.3.2 Deliverables and Achievements

- D8.1- Kick-off WP meeting and report (**month 6**). –Completed.
 - The Kick-off meeting of WP8 - Functional Genomics in Studies of Acupuncture-Moxibustion and Meridians was held on schedule from 31 October to 1 November, 2009 in Beijing, China. The kick-off meeting report was delivered to the CO.
 - The meeting was hosted by Capital Medical University of China, and organized by the WP8 coordinator Dr. Xiaomin Wang. The attendants included six WP8 members, two WP6 members and five invited specialists.
 - The 3-year plan was discussed with the focus on the tasks and deliverables.
 - It was agreed that the web-mediated communication is important for internal business management and the WP8 webpage was designed and updated regularly to introduce the progress of Acupuncture-Moxibustion related topics. Tasks related to the literature review and reports of WP8 were allocated.
- D8.2- Website building and maintenance (month 6) –Completed.
 - Following the website style and operation protocol, which were designed by GP-TCM website editorial board, WP8 collected and updated website contents, such as news, publications, event logs, etc, and participated in the database creation under the WP8 privilege with related data entries. Major contributors



were Wei Ding, Jun Jia, Yun-Hua Cui, et al. Also thanks to Halil Uzuner and Tai-Ping Fan for help and comments.

- D8.3- Questionnaire designed and carried about the concerns and attitude of doctors, nurses, patients and the public on possible future clinical trials of acupuncture and CHM (in partnership with WP6) (**month 12**)- Completed
 - Discussions between WP6 and WP8 agreed that the collaboratively designed questionnaire survey should target TCM practitioners (acupuncture, moxibustion and Chinese herbal medicine), a variation on the deliverable. A protocol was agreed and drafted. The survey items included: type of treatments, common conditions treated, the use of the keys herbs identified by consensus of WPs, perceptions of safety, attitudes to participation in clinical trials of TCM, demographic characteristics of practitioners, TCM clinical experience and training, evidence gaps and areas for future clinical trials should focus. Delay in drafting the questionnaire was an advantage to WP8 as the finalised herb list was agreed by all WPs in August 2010.
 - The questionnaire was designed by the authors and members of GP-TCM, including acupuncturists and other researchers from both China and the EU who had expertise in epidemiology and health service evaluation (see authors and acknowledgements). The questionnaire was piloted on 20 acupuncture EU practitioners and 20 Chinese practitioners and amended accordingly. The questionnaire was translated into Chinese and back translated by other Chinese speakers to ensure meaning was comparable. Given the diverse languages in European countries the EU questionnaire was only available in the English language.
 - The questionnaire included both open and closed questions: demographic details, training, practice setting, acupuncture techniques used, perceived adverse event reporting, diagnostic methods, conditions commonly treated, conditions where practitioners felt more evidence was needed and identification of conditions they perceived would show benefit if investigated in a clinical trial. The questionnaire was completed online in the EU and on paper in China, due to limited access to acupuncturists in China via Survey Monkey software (<http://www.surveymonkey.com>) was used.
 - WP8 and WP6 (CHM) launched an acupuncture and TCM practitioner survey across Europe and China. From 1126 survey responses, 1020 (559 EU, 461 China) could be included in the analysis for direct comparison. The survey (WP8 part) explored the acupuncture practitioners to identify the most common conditions treated by acupuncturists and compare the difference conditions by acupuncture practitioner in China and EU.
 - The report has been delivered to the Co-ordinating Office and the survey results have been published in GP-TCM Special Issue of the JEP, 2012.
- D8.4- Teleconference to discuss major problems or topics in acupuncture in connection of functional genomics (**quarterly**) –Completed with the scheduled events to date
 - Web-based communications are important for the management of Work Package 8 (WP8) internal businesses and for introducing the progress of



acupuncture-moxibustion related topics. WP8 leads have developed well-organised communications with members of the coordination office (CO), WP6 and WP8 by phone and email, to discuss the GP-TCM issues.

- Frequent teleconferences, email communications and face-to-face meetings were used to discuss WP8 problems. 36 teleconference meetings were held and the D8.4 was updated quarterly.
 - WP6 & 8 Face –to-Face Meeting was held in the Beijing Landmark hotel in 21st September 2011 to discuss the WP6/8 final year plans.
 - The report was regular updated and the final version will be submitted to the CO in April 2012.
- D8.5- Primary report on pitfalls and solutions for functional genomics studies of acupuncture (**month 24**) - Completed
 - A report was been produced and submitted to the co-ordinating office. This report focusing on the pitfalls and solutions for functional genomic studies in acupuncture has been delivered to the Co-ordinating Office.
 - The report discussed the following:
 - Based on the research expertise and experience of WP8 participants, general agreement was reached from the analyses of current available literature and was utilised to explore the pitfalls and solutions for the challenge of functional genomics studies in acupuncture and moxibustion
 - The prioritised investigation focused on the two aspects: clinical research on acupuncture-moxibustion; basic research on acupuncture-moxibustion and meridians.
 - The information collected was composed for publication in the Journal of Ethnopharmacology special issue and other scientific journals.
 - D8.6- Present work in the Final Conference (**month 36**)
 - The presentation took place in the GP-TCM Final Conference in Holland in 2012.
 - D8.7- Final report on functional genomics studies of acupuncture and moxibustion (**month 36**).
 - Final report submitted to the CO.
 - D8.8- Submit the report for publication (month36).

Various publications disseminating the activities of the work package have been produced and are detailed below:

Special issue papers published:

- Jia J, Yu Y, Deng JH, Robinson N, Bovey M, Cui YH, Liu HR, Ding W, Wu HG, Wang XM. A review of Omics research in acupuncture: the relevance and future prospects for understanding the nature of meridians and acupoints. J of Ethno pharmacology, 2012; (140) 594–603.
- **Robinson N**, Lorenc A, Ding W, Jun J, Bovey M, Wang X. Exploring practice characteristics and research priorities of practitioners of traditional acupuncture in China and the EU - a survey. J of Ethno pharmacology. 2012; (140) 604 - 613.

Other relevant GP-TCM articles supported by WP8 members:



- Uzuner H, Bauer R, Fan T, Guo D, Dias A, El-Nezami H, Efferth T, Williamson EM, Heinrich M, **Robinson N**, Hylands PJ, Hendry BM, Cheng Y, Xu Q. Traditional Chinese Medicine Research in the Post-genomic Era: Good Practice, Priorities, Challenges and Opportunities. *J of Ethno pharmacology*, 2012; (140): 458-468
- Huo LR, Liang XB, Li B, Liang JT, He Y, Jia YJ, Jia J, Gong XL, Yu F, **Wang XM**. The cortical and striatal gene expression profile of 100 Hz electroacupuncture treatment in 6-hydroxydopamine-induced Parkinson's disease model. *Evid Based Complement Alternat Med*. Epub 2012 Jan 26; 2012, Article ID 908439 (doi:10.1155/2012/908439).

Published abstracts:

- Liao X, Lui J, Lorenc A, **Robinson N**. How do Chinese Medicine (CM) doctors communicate with their patients? A qualitative analysis. *European Journal of Integrative Medicine* 2010; 2: 199-200.
- Liao X, Liu J, **Robinson N**. Using qualitative research to investigate Chinese medicine doctors' practice. *Journal of Traditional Chinese Medicine* 2011; 31(Supplement): 33.
- **Robinson N**, Lorenc A, Ding W, Jia J, Mark Bovey, Wang X. Identifying the evidence gaps in acupuncture – experiences of an international project: Good Practice in Traditional Chinese Medicine (GP-TCM). Integrative Medicine Consortium Congress. Integrative Medicine and Health 2012 15-18 May 2012 Portland, Oregon, USA To be published in BMC-CAM

Other scientific articles where the GP-TCM project was mentioned:

- Robinson N. 'Globalising' – 'Integrating' Traditional Chinese Medicine. *The Acupuncturist*. British Acupuncture Council, 2010/ November p19-20.
- Robinson N. Integrative medicine- Traditional Chinese Medicine, a model? *Chin J Integrative Medicine* 2011; 17: 1-5.
- Bovey M, Robinson N. Researching China. *The Acupuncturist*. British Acupuncture Council, 2011/ Autumn p20-21.

Editorials

- Robinson N. *European Journal of Integrative Medicine* 2012; (2) e. (in press)
- Robinson N. *European Journal of Integrative Medicine* 2011; (3) e47-48. doi:10.1016/j.eujim.2011.04.023
- Robinson N. *European Journal of Integrative Medicine* 3 2011; (4) e247 doi:10.1016/j.eujim.2011.04.023

Papers in preparation for publication from GP-TCM collaboration

- Robinson N, Lorenc A, Lophatananon A, Muir K. Traditional Chinese Herbal medicine practice- a comparison between EU and Chinese traditional practitioners (in preparation) - a WP6 Output from the survey
- Qu, F, Zhou J, Bovey M, Chan K, Jiang D, Robinson N. Does acupuncture improve the outcomes of in vitro fertilization: Guidance for future trials in Human Reproduction.
- Qu, F, Robinson N. Traditional Medicine- challenges for research (book chapter in *Complementary and Alternative Medicine: Evaluating Methods and Assessing Effectiveness* Eds McCarthy, Peter W and Mark Langweiler. Jones and Bartlett learning (In preparation)



Published Conference presentations

- Robinson N, Bovey M, Lorenc A. What do acupuncturists do – fertility related practice in the UK. 9th Meeting of Consortium for Globalization of Chinese Medicine (CGCM) Hong Kong, 23 – 25 August, 2010.
- Bovey M, Robinson N. How is acupuncture used to support fertility issues? A survey of practitioners' experiences and perceptions. Society for Acupuncture Research March 2010. Chapel Hill North Carolina, 19-21 March 2010.
- Liao X, Liu J, Robinson N. A qualitative exploration of CM practitioners' treatment of chronic diseases in Beijing and London. International Congress on Complementary Medicine Research (ICCMR), Tromso 19-21 May 2010.
- Robinson N, Lorenc A, Ding W, Jia J, Bovey M, Wang X. The evidence challenge for TCM. Good practice in Traditional Chinese Medicine. Leiden, Holland. 15-18 April 2012

Oral presentations

- Developing the future for research activities through GP-TCM through collaboration and partnership working, 10 May, 2011. Capital Medical University, Beijing.
- Does TCM have a role in public health? All parliamentary group on China, 6 June, 2011. Houses of Parliament.
- "Can practitioner and patient centred research support the evidence base for TCM ?" The 8th World Congress of Chinese medicine. Traditional Chinese Medicine benefits human health, 2 Sept., 2011. Westminster Central Hall, London.
- Integrating traditional Chinese medicine – opportunities and challenges? 17 Sept., 2011. British Acupuncture Council Conference.
- Acupuncture – Finding the evidence – the experience of GP-TCM. International Symposium on acupuncture. 22-24 Sept., 2011. Beijing. China.
- TCM – An integrative approach to disease prevention and health promotion. Beijing Forum on Traditional Chinese Medicine- sub forum on TCM Cultural inheritance and scientific development. 30-31 Nov., 2011. Beijing, China
- What do we mean by integrated health in TCM? A comparison of UK and Chinese systems. Parliamentary Group on Integrative health, 23 January, 2012. London, UK
- WP8 - Good Practice in Traditional Chinese Medicine Research in the Post-genomic Era, 13 April, 2012. Rolduc, Kerkrade, Holland
- Capital Medical University and TCM research, 16 April, 2012. Leiden, Holland
- The evidence challenge for GP-TCM, 17 April, 2012. Leiden, Holland
- The sketch of clinical oriented acupuncture basic research in China based on literature analyses, 18 April, 2012. Leiden, Holland.

1.4. Year 3 experiences gained and lessons:

- Several considerations were planned and carefully balanced during the entire team assembly processes, such as stability/dynamism, specialty/collaboration, broad coverage/representative subjects, and experienced seniors/young enthusiasts, etc. The WP8 leads remained steady and were serving cooperatively with smooth communication. The appointment of a new co-coordinator for WP8 was important to overcome any language barriers and to ensure broader networking to include wider stakeholders and members. This was crucial to provide consistency for the well-consented interests and objectives of the WP8 group.



- The survey identified differences in practice and training between acupuncturists in China and the EU and between EU member states. These differences may inform prioritisation of health conditions for future trials. Innovative research methods are recommended to incorporate the complexity and plurality of acupuncture practice and theory. Creation of collaborative networks is crucial in overcoming these differences to facilitate international, multi-centre clinical trials.
- High-throughput genomic and proteomic profiling of gene expression in tissues has been able to identify potential candidates for the effects of acupuncture and provide valuable information toward understanding the possible mechanisms of the therapy. However, without further holistic and sophisticated analyses in the context of metabolomics and systems biology, the current attempts and the foreseeable developments appear to be insufficient to produce concrete conclusions.
- Disease-oriented studies using the approach of multi-indexed high-throughput technologies and systems biology analyses will be a preferred strategy for future acupuncture/moxibustion research.

1.5. WP8 summary to Year 1-3:

- The communication and collaboration platform was created and the network was effective to evaluate the current status of acupuncture research and practice in both China and EU.
- WP8 and WP6 (CHM) launched an acupuncture and TCM practitioner survey across Europe and China. The survey (WP8 part) explored the acupuncture practitioners to identify the most common conditions treated by acupuncturists and compare the different conditions treated by acupuncture practitioners in China and EU. Their views on effectiveness were ascertained in order to identify areas where clinical trials on acupuncture should focus.
- A report highlighted the role of “omics” technologies in acupuncture research.
- WP8 also used a text mining-based approach and performed comprehensive analyses using data retrieved from the Chinese publication records and funding information. From the objective sketch revealed from the results, the community, inter-collaborations and the research highlighted current Chinese clinical-related acupuncture basic research. The advances of post-genomic informatics’ technologies for literature studies were demonstrated in our research.

1.6. WP plans for future activities towards the extended lifespan of the FP7 GP-TCM project

- The updated D8.4 teleconference report was submitted in April 2012.
- The final report on functional genomics studies of acupuncture and moxibustion will submit to the Coordination Office in April 2012.
- Submit articles from the research highlights in the current Chinese clinical-related acupuncture basic research by October 2012.
- Further enhance the collaborative network of acupuncture research in China and EU.



1.7. WP suggestions to the GP-TCM Research Association regarding the future of the area covered by WP8

Focused on several diseases or symptoms with evidence of effectiveness by acupuncture treatment, the approach of combination Omic technologies with functional molecular imaging will be a preferred strategy for future acupuncture research on the WP8.

1.8. WP Finances (details of your current WP budget):

CCMU was awarded with € 37,450 for the WP8 project-Functional Genomics in Studies of Acupuncture-Moxibustion and Meridians. €13,100 was used for the WP8 kickoff meeting in Beijing NuoLin Hotel from 31st October to 1st November 2009. A total of € 5,000 was spent for network service and human cost for conducting and analysing the survey. € 5,000 of the remaining funds from kick-off meeting were used for a combined face-to-face meeting carried out between WP6 and 8 in Beijing, China to obtain consensus for activities in the final year and potential publications.

1.9. Final Conclusions:

- WP8 has formed an extensive collaborative panel in acupuncture clinical and basic research more than seven countries both in China and EU. The WP8 members took an inclusive approach to this task and invited clinical scientists to an initial exploratory conference.
- The results from the online survey identified differences in practice and training between acupuncturists in China and the EU and between EU member states. It is suggested that creation of collaborative networks is crucial in overcoming these differences to facilitate international, multi-centre clinical trials.
- WP8 has created a review of existing literature and suggested a preferred strategy for future acupuncture/moxibustion research.
- WP8 also defined the current Chinese clinical-related acupuncture basic research status to highlight the community, inter-collaborations and the research in China and EU.