



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

**GP-TCM**

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**D8.6**

**Present work in final conference**



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## 1 PREPARE AND SUMMARISE WP8'S WORK

All WP8's work and findings over the full course of the project (May 2009 to April 2012) were presented during the GP-TCM Final Conference and the GP-TCM Congress. The WP8 session in the Final Conference was chaired by Professor Xiaomin Wang and presented by Professor Wei Ding on 13<sup>th</sup> April 2012 in Kerkrade, Holland. The title of the presentation was WP8 - Good Practice in Traditional Chinese Medicine Research in the Post-genomic Era. The project objectives, team and human resources of WP8, deliverables and achievements, year 3 experiences gained and lessons, WP8 suggestions regarding the future research were included in this report and are given below. The full report was submitted as deliverable report D8.7 (Final report on functional genomics studies of acupuncture and moxibustion).

### 1.1 WP8 presentation in the GP-TCM final conference

- **A brief introduction to the WP 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. Specific objectives were:

- 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.

- **A brief history of WP membership and leadership development:**

- The members of the work package originally consisted of 6 beneficiary members and 5 non-beneficiary members.
- WP8 group was first established by Prof Xiaomin Wang (China). It is now co-organised by Professor Xiaomin Wang from the Capital Medical University and Prof Nicola Robinson from London South Bank University.
- The WP8 accepted 3 new beneficiary members making the total number of 9 beneficiary members. WP8 appointed 16 new non beneficiary members from UK, China, Germany, Italy, Sweden, Romania and Austria, making the total number of 21 non beneficiary members.

- **Year 3 WP activities:**

In year 3, WP8 had 5 deliverables.

1. Communication activities:

- Regular teleconferences, email communications and face-to-face meeting were used to discuss WP8 problems. More than 34 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 21<sup>st</sup> Sept. 2011 to discuss the WP6/8 final year plans.

2. Report activities:



- A 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 utilised to explore the pitfalls and solutions for the challenges of functional genomics studies in acupuncture and moxibustion
  - The prioritised investigation focused on two aspects: clinical research on acupuncture-moxibustion; basic research on acupuncture-moxibustion and meridians.
  - The information collected was used to inform the publications accepted for the Journal of Ethnopharmacology special issue and other scientific journals.
- Final report has been submitted to the Coordination Office (CO) in April 2012.
  
- 3. Final Conference activities:
  - Presentation delivered at the Final Conference in Holland by Prof Wei Ding (2012).
  
- 4. Publication activities:
  - Two articles from the work of WP8 have been published on the Journal of Ethnopharmacology special issue and a third paper has been published in Evid. Based Complement Alternat. Med.
    - 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 Ethnopharmacology 140 (2012) 604–613.
    - 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 electro-acupuncture 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)
  
- **Year 3 deliverables (to cover all deliverables from months 25 to 36 and to include any delays involved and actual submission dates):**
  - D8.4- Teleconferences to discuss major problems or topics on acupuncture in connection with functional genomics (quarterly). The report was regularly updated and the final version has been submitted to the GP-TCM CO in April 2012.



- D8.5- Primary report on pitfalls and solutions for functional genomics studies of acupuncture (month 24). A report was been produced and submitted to the CO.
  - D8.6- Present work in the Final Conference (month 36). The presentation has taken place in the GP-TCM conference in Holland in 2012.
  - D8.7- Final report on functional genomics studies of acupuncture and moxibustion (month 36). Final report has been submitted to the CO.
  - D8.8- Submit the report for publication (month36). The 2 articles have been published in the Journal of Ethnopharmacology special issue and a third paper has been published in Evidence Based Complementary and Alternative Medicine
- **Year 3 experiences gained and lessons:**
    - The deliverable 8.5 was to report on pitfalls and solutions for functional genomics studies of acupuncture. An overview of publications indicated that several diseases or symptoms with evidence of effectiveness had been piloted using functional genomic technologies, such as Parkinson's disease, allergic disorders, pain, and spinal cord injury, most of which are chronic "difficult diseases". High-throughput genomic and proteomic profiling of gene expression in tissues was 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. Noticeably, the recent rapid advances in functional molecular imaging targeting specific metabolites have shown great promise and if combined with other post-genomic technologies, could be extremely helpful for acupuncture studies in human subjects.
  - **WP 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 acupuncture practitioners to identify the most common conditions treated by acupuncturists and compare the different conditions treated by acupuncture practitioners in China and the EU. Their views on effectiveness will ultimately help develop clinical guidelines of acupuncture usage internationally.
    - A report highlighting the role of "omics" technologies in acupuncture research.
    - WP8 have used a text mining-based approach and performed comprehensive analyses using data retrieved from the Chinese publication records and funding information. Results from the objective sketch of the research field in acupuncture revealed that different research collaborations could be identified and highlighted which areas of current Chinese clinical-related acupuncture basic research could be identified. The advances of post-genomic informatics' technologies for literature studies were demonstrated in our research.



- **WP plans for future activities towards the extended lifespan of the FP7 GP-TCM project**
  - Submitted updated D8.4 teleconference report in April, 2012.
  - Final report on functional genomics studies of acupuncture and moxibustion has been submitted to the CO in April 2012.
  - Submit article 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.
- **WP suggestions to the GP-TCM Research Association regarding the future of the area covered by your WP**
  - Focus on specific diseases or symptoms with evidence of effectiveness with acupuncture treatment. The approach of combination Omic technologies with functional molecular imaging will be a preferred strategy for future acupuncture research on the WP8.
- **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 Oct. to 1<sup>st</sup> Nov. 2009. A total of € 5,000 was spent for developing the network service and personnel costs for conducting and analysing the survey. € 6,000 of the remaining funds were used for a combined face to face meeting carried out between WP6 and 8 in Beijing to obtain consensus for activities in the final year and potential publications.
- **Final Conclusions:**
  - WP8 has formed an extensive collaborative network in acupuncture clinical and basic research in more than seven countries including 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 research communities in China, inter-collaborations within China and EU.

## **1.2 Minutes of final conference**

1.2.1 The WP8 objectives and work progress were outlined. Details on the deliverables were presented:

- A report highlighted the role of “omics” technologies in acupuncture research;
- Disease-oriented studies priorities were proposed;
- The survey on the practice and perceptions of acupuncture practitioners in EU and China from the WP6/8 practitioner survey was discussed;



- The current status of Chinese clinical-related acupuncture basic research to highlight the research collaborations in China and EU was defined.

Summary: 2 contributions had been published in the special issue of the Journal of Ethno pharmacology and another paper published in the Evidence Based Complementary and Alternative Medicine.

1.2.2 The China National Knowledge Infrastructure (CNKI), was introduced by Prof. Wei Ding. The text-mining approach was used to conduct literature analyses indicated that disease-oriented acupuncture basic studies in China were reflected in Chinese academic literature databases

Summary:

- Basic research using modelling and technology identified the location of current research
- Ph.D. thesis records were representative of current research collaborations
- Limited reports on certain difficult diseases focussing on clinical applications

1.2.3 Prof. Geoffrey Burnstock invited as a special speaker gave a short presentation focused on how acupuncture inhibits pain. The hypothesis was as follows:

- Skin keratinocytes release ATP during acupuncture needle stimulation;
- ATP binds to specific receptors located on sensory nerves endings in the skin known as P2X3 and P2x2/3;
- The signal messages are then relayed via dorsal root ganglia in the spinal cord;
- Subsequently through interneuronal pathways to the brain stem that contains motor neurons which control the major targets for acupuncture;
- Signals also travel to pain centres in the cortex, delivering a message to inhibit pain.

### **Discussions:**

The discussions that followed focussed on the two presentations described above

Nicola Robinson: My research in the UK has shown that acupuncture is the most popular topic chosen by PhD students.

A comment was also raised relating to pain and how to explain the function of injection or pressure in skin during acupuncture?

Geoffrey Burnstock: The message of skin initiates a biochemical function which controls all the genomic function. Neurons participate in the message transmission and ATP is released. Special receptors of ATP are involved in this signal transmission of acupuncture stimulation.

Vivian Wong commented that there were in vivo functional MRI studies which will benefit the acupuncture research as they provide evidence on mechanisms.

Qihe: Experiments have demonstrated that pain can be modulated by acupuncture. Discussion followed about the roles of receptors and how animal models may be used to explore acupuncture mechanisms given Prof. Burnstock's hypothesis.

Xiaomin Wang commented that this novel hypothesis is only can be used to test pain treatment. As we all knows, the pain is one kind of sensory output. There are other higher level CNS structures can modulate the pain. How cells transmit the signal to the different levels in the central nervous needed to be investigated. There are some interneurons, which can release different neurotransmitters at the different levels. More studies were required to consider the mechanism of pain and the modulative effective of acupuncture.





Geoffrey Burnstock: The short term transmission may explain pain sensation.

Xiao- Min Wang: There should be the long term transmission interpretation for sensory pain and this hypothesis may be important to demonstrate how the sensory signals transduced from the beginning. Future studies should focus not only on pain but also on stroke, Parkinson's disease, Alzheimer's disease.

Vivian Wong: You mentioned that acupuncture works with the skin stimulation and goes beyond the skin. However, studies using sham acupuncture also show an effect. Sham acupuncture usually involves touching the skin. The question is how much does it stimulate the skin?

Nicola Robinson: Comparative effectiveness research is being more popular in conventional medicine particularly in the USA, where routine treatment is compared with routine treatment plus another intervention. This kind of research is also important for acupuncture.

Xiaomin Wang: Acupuncture is very good. It is cheap, convenient, and has no side-effects. So it deserves further study on its mechanisms.



## 2 ABSTRACTS ON THE GP-TCM CONGRESS

During the GP-TCM congress, one short lecture and two invited oral reports were presented from WP8 members. The Conference abstracts are given below.

1. 16<sup>th</sup> April 2012 - Capital Medical University and its TCM research. Prof. Xiaomin Wang, in Leiden, Holland.
2. 17<sup>th</sup> April 2012 - The evidence challenge for GP-TCM. Prof. Nicola Robinson, in Leiden, Holland.
3. 18<sup>th</sup> April 2012 - The sketch of clinical oriented acupuncture basic research in China based on literature analyses. Prof. Wei Ding, in Leiden, Holland.

Abstract 1:

### **Capital Medical University and its TCM research**

*Prof. Dr. Xiaomin Wang*

Capital Medical University, Beijing, China

Capital Medical University (CCMU, Website: [www.ccmu.edu.cn](http://www.ccmu.edu.cn)) was founded in 1960. It ranks among the top medical institutions in China and is honored as the only key municipal university in Beijing. CCMU consists of 10 schools, 18 affiliated hospitals and 1 teaching institution. About 23,000 faculty and staff members of the university and its hospitals are providing education and health care to Chinese people and international friends. The enrollment of students is over 14,000. In China, CCMU is a well-known academic league for its achievements and resource in the clinical and translational research. It hosts a number of national or municipal key discipline sites and laboratories. The top-level national and municipal research and training center is founded at CCMU, covering a wide range of fields including clinical medicine, basic medicine, general practice, neurosciences, and traditional Chinese medicine, etc. The University has received national and international recognitions in various research fields. CCMU also established many excellent international exchange programs in partnerships with many universities and institutions from more than 20 countries. The faculty/student exchange programs and joint education/research projects have benefited hundreds of scholars for past few years. We are seeking for international partners to develop joint medical education, research co-operation, students and faculty training and exchange programs.

Abstract 2:

### **The evidence challenge for GP-TCM**

*Nicola Robinson* 1, *Ava Lorenc* 1, *Wei Ding* 2, *Jun Jia* 3, *Mark Bovey* 4, *Ken Muir*, 5 *Artitaya Lophatananon*, 5 *Xiaomin Wang* 3

<sup>1</sup> London South Bank University, London.

<sup>2</sup> Department of Biochemistry and Molecular Biology, Capital Medical University, Beijing, China.

<sup>3</sup> Department of Physiology, Capital Medical University, Beijing, China.

<sup>4</sup> British Acupuncture Council, London.

<sup>5</sup> Warwick University, Coventry.

Traditional Chinese Medicine (TCM) includes a range of practices; herbal medicine, acupuncture, cupping, moxibustion, tuina, qigong, taiji and dietary therapy. TCM is historically based on the theoretical and scientific principles integral to Chinese medicine. Practitioners assess their patient's condition based on traditional techniques to differentiate Chinese medicine syndromes in order to determine their clinical care and treatment.



In China, TCM is regarded as an equal partner with western medicine in providing healthcare. It is available to all and is integrated into national western medical education, training and service provision. Training is regulated by the State Administration of Chinese Medicine. TCM training in the west is more diverse, but knowledge about the differences in TCM education and practice between different countries is lacking. There is also limited information on the practitioners themselves who provide acupuncture treatment: how practitioners are trained, what conditions are commonly treated, what responds best to treatment, and the characteristics of the treatment provided.

A survey was carried out by work packages 6 and 8 of the GP-TCM, European Cost FP7 project. The overall aim was to explore differences between the EU and China in TCM practice and practitioners' perceived need for research evidence. In addition the outcomes were used to identify key topics for future research and to define priorities and potential pitfalls for future clinical trials and reach consensus on acupuncture evidence gaps from European and Chinese TCM practitioners.

TCM practitioners were invited to participate in an on-line survey during December 2010 - July 2011. TCM professional groups and specific Chinese teaching hospitals were asked to participate using convenience and purposive sampling. EU TCM professional groups were identified through the World Federation of Chinese Medicine and 52 organisational leads contacted. For the Chinese sample, where the majority of TCM practice occurs in hospitals, institutions in 7 different provinces were invited to participate. Practitioner data collected included: demographic details, country of training, practice setting, techniques used in practice, perceived adverse event reporting, diagnostic methods, conditions commonly treated, conditions where practitioners felt they needed more evidence and practitioner identification of conditions they felt would show benefit by being investigated in a clinical trial. Data was analysed using appropriate descriptive and analytical tests using SPSS, with content analysis of qualitative data.

Of the 1126 responses, 1112 (598 EU, 514 China) were included in analysis. Chinese respondents were more likely to practice in hospitals, and EU practitioners in private practice ( $p < 0.001$ ). For acupuncture pain was the most commonly treated condition by EU practitioners and neurological conditions by Chinese practitioners. For herbal medicine obstetric/gynaecological conditions were most commonly treated by EU practitioners and neurological and gastrointestinal by Chinese practitioners. Main priorities for research (both acupuncture and herbal) in the EU were obstetrics/gynaecology (infertility, dysmenorrhoea and menopause), for China it was stroke and facial paralysis. Chinese practitioners were less likely to want to participate in future trials (27% vs 64%,  $p < 0.001$ ).

Practice and perception of evidence varied widely between practitioners within the EU and China. This can create difficulties for international projects when trying to obtain clarity on evidence gaps and priorities for future research.

This study highlighted issues for conducting international projects, such as differences in training; classifying conditions using both TCM pattern differentiation and Western diagnoses; different professional structures, and identifying practitioners representative of current practice.

Other important topics for future research could include; whether practitioners use research knowledge in determining their treatment approach, the contribution from RCTs in determining which acu points or herbs are selected in clinical practice and how TCM practitioners use evidence based knowledge.

The role of TCM practitioners in research is critical but international multi centre research will require precise clinical trial standards and research methodology input from Western scientists. Future research will need to incorporate the complexity and plurality of traditional Chinese medicine theory and practice, informed by comparative effectiveness studies, personalised medicine and TCM pattern differentiation.

Abstract 3:



## **The sketch of clinical oriented acupuncture basic research in China based on literature analyses**

Wei Ding<sup>1\*</sup>, Jun Jia<sup>2</sup>, Nicola Robinson<sup>3</sup>, Xiaomin Wang<sup>2\*</sup>

*1Department of Biochemistry and Molecular biology, Capital Medical University, Beijing 100069, China*

*2Department of Physiology, Capital Medical University, Beijing 100069, China*

*3Faculty of Health and Social Care, London South Bank University, London SE1 0AA, UK*

Beyond that of well being, TCM treatments using acupuncture/moxibustion are effective in alleviating the symptoms of various “difficult diseases”. As TCM basic research is becoming more and more focused to meet clinical demands in the context of translational medicine, to learn about the current status of Chinese TCM research can be helpful in many aspects, including scientific communication and project development for international collaborations. We have 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 highlights in the current Chinese clinical-related acupuncture basic research could be identified. The advances of post-genomic informatics’ technologies for literature studies were demonstrated in our research.