

Supplementary Table 1 - Grand priority candidates: Ranking based on percentage of votes received from GP-TCM members and external participants

Ranking				Grand Priorities
GP-TCM Members		External Participants		
Order	Vote (%)	Order	Vote (%)	
1	72.4	7-8	48.6	High-quality research to evaluate the quality and safety of CHM, due to recently and frequently misidentification, adulteration and contamination of Chinese herbal products
2	71.1	3	59.5	High-quality clinical efficacy and effective studies of CHM and acupuncture
3-5	59.2	18-20	33.3	Taking advantage of the EU-China dialogue channels strengthened through the FP7 GP-TCM Consortium and other consortiums, organisations and societies, develop EU-China joint centres, initiatives and adventures focused on TCM and CMM products
3-5	59.2	5	55.9	High-quality research to demonstrate the mechanisms of action of CHM and acupuncture
3-5	59.2	2	60.4	Identify priority (disease) areas where TCM is likely to help to achieve better outcomes for patients and the society
6	57.9	11	44.1	Quality control for those CMMs which were widely used in clinics
7	53.9	18-20	33.3	Taking advantage of the maturing “omics” technology and emerging systems biology methodologies, carry out cutting-edge TCM and complex herbal product research
8	52.6	15	39.6	Pharmacovigilance and safety of CMMs
9	51.3	12-13	43.2	Special attention should be paid to rational use of Chinese medicinal plants, especially about those endangered plants, in order to keep sustainable use, maintain biodiversity and protect our environment
10	50.0	10	45.0	Database for compiling all relevant information about TCM. Such database would provide critical information to interested groups according to a priority topics as well as a tool to centralise all available scientific literature or documents
11	48.7	4	58.6	CHM and acupuncture in prevention and treatment of chronic diseases
12	47.4	6	55.0	Upgrade EU funding and pool funding from a variety of sources to build international research collaborations to support evidence-based clinical and basic research on some maturing areas of TCM, including CMM products
13	43.4	14	40.5	TCM knowledge-based development of new Western medicines and new types of complex medicines, including new drug R&D from classical TCM formulas
14	42.1	9	47.7	Respect and protect traditional knowledge from TCM, and fairly share TCM intellectual property rights with all the parties concerned
15	40.8	21	28.8	Bridging modern personalised health (including sub-health condition), with personalised TCM diagnosis and treatment using “omics” and systems biology
16	39.5	18-20	33.3	Harmonised monographic quality of CMMs and related granule forms: regulatory standards (including the pharmaceutical science of processing CMM)
17	38.2	17	35.1	Literature review (open source and grey literature) to understand and to know the studies and evidence of TCM and to identify gaps
18-19	35.5	28	15.3	Rationalisation, separation and clarification of separate drives to both identify and fully characterise individual active CHM agents and/or to evaluate the more holistic approach to TCM
18-19	35.5	1	67.6	Develop national policy for TCM, support integrating TCM into mainstream health care system, especially in the primary care system, for example, put the herbal medicine as essential drugs in the health insurance package
20	32.9	16	37.8	Interdisciplinary, international and intersectoral (public-private collaboration) training models should be explored to enable the TCM research community

				to address the complexity of Chinese materia medica (CMM) and TCM using advanced modern technologies
21	31.6	7-8	48.6	Cross platform and combined treatment initiatives for some of the prevalent diseases such as diabetics, cancer and neurodegenerative symptoms etc by combining TCM, Gene Therapeutics, Immune system therapeutics etc
22	30.3	22	27.9	Research methodology development focusing in TCM diagnostics leading to standardisation of TCM syndromes of 'Zheng'
23	27.6	24	26.1	Postgraduate training curriculum for specialties starting with acupuncture, traumatology and 'internal medicine'
24	26.3	26	21.6	CMMs used as functional foods
25-26	22.4	23	27.0	Start social network for discussing TCM from a scientific point of view
25-26	22.4	12-13	43.2	A harmonised undergraduate curriculum for TCM in English with a subset for conventional medical schools; A harmonised curriculum has been achieved in the medical training system in China and some other Asian countries and could be tested in Europe
27	19.7	25	25.2	Start different levels and different length of introductory courses on TCM for health professionals. This could also be on the spot information event to personnel of a hospital, meetings of pharmacists, medical specialists, etc. For this a database with possible speakers should be made
28	19.7	27	18.9	Analysis and research should be done to address possible allergic reactions to CMMs

Supplementary Table 2 - Grand challenge candidates: Ranking based on percentage of votes received from GP-TCM members and external participants

Ranking				Grand Challenges
GP-TCM Members		External Participants		
Order	Vote (%)	Order	Vote (%)	
1	63.2	4	44.1	Quality control of CMMs and complex herbal products
2	51.3	3	45.9	Lack of European funding for TCM research, comparing to the circumstances in China and the USA
3-4	50.0	23-25	26.1	Pharmacovigilance of complex herbal products
3-4	50.0	5	43.2	Focus on TCM research efforts on certain chronic diseases and conditions, which TCM has established good track record of efficacy by using scientific method to establish and prove the efficacy
5	48.7	9-11	37.8	Differences between conventional (“Western”) and Chinese medicine paradigms are reflections of, and interwoven with, differing concepts of health and disease and go deeply into different attitudes and beliefs about health preservation and disease causation. Consequently, working towards a common language, first identifying differences and then trying to find a common ground from both traditions, is a major challenge and one of the first grand tasks
6	46.1	12-15	36.0	Integration of TCM, which is personalised, holistic and has a strong emphasis on prevention, with modern Western medicine, which has come to the post-genomic era, striving for “omics”-based personalisation and holistic and pre-emptive approaches: challenges on both sides
7	43.4	26-27	25.2	Defining minimal toxicity testing required to ensure (likely) safe use of medicinal herbs (general problem not limited to CHM)
8	42.1	9-11	37.8	The language barrier and the poor access to TCM literature in Europe
9	40.8	23-25	26.1	GxP for CHM (i.e. Good Agricultural and Collection Practice, Good Manufacturing Practice, Good Distribution Practice etc)
10	39.5	9-11	37.8	An evaluation of TCM contribution to European health system and consumers' perception
11-12	38.2	6	42.3	New EU regulation and its impact on the complex herbal product industry
11-12	38.2	31-33	20.7	The accessibility to modern research methods such as “omics” and systems biology needed to address the complexity of CMMs
13-15	35.5	7-8	41.4	TCM terminology and its proper definition to promote accurate understanding and avoid misinterpretation. It is not merely translation of terminology, but trying to define the terminology in both medical “languages”
13-15	35.5	31-33	20.7	Risk-benefit assessment of CHM, especially of multi-preparations or formula commonly used by TCM practitioners
13-15	35.5	1	50.5	Regulation of TCM practitioners in the EU
16-17	32.9	16-18	35.1	Placebo should be proven inert but to prove this could be equally difficult as to prove a drug is effective. Thus, placebo controls for CHM and acupuncture studies are difficult to design but placebo control is often required for convincing evidence of efficacy. Thus, designing different controls to suit for trials of different types of CHM and the level of acceptance, by the public and the scientific community, of evidence for effectiveness of CHM and acupuncture (without placebo controls) represent a dual challenge
16-17	32.9	20	30.6	TCM uses thousands of CMMs. It is a grand challenge to determine which ones should be accepted in the EU market, to which conditions and which ones should be barred from the market
18	31.6	12-15	36.0	Patients' reported outcomes (PROs) assessed by approved quality of life (QOL) instrument as acceptable objective measures of TCM treatment efficacy in clinical trials

19	30.3	19	33.3	Sorting out CHM according to safety and known/probable toxicities: proven toxic herbs (e.g. pyrrolizidine alkaloids, aristolochic acids, ... containing plants); highly suspected herbs; (supposedly) detoxified toxic herbs (e.g. Aconitum); probably safe herbs; proven safe herbs
20-21	28.9	23-25	26.1	Bridging modern personalised health (including sub-health condition), with personalised TCM diagnosis and treatment using "omics" and systems biology
20-21	28.9	28	22.5	Alternative methods to animal testing
22	27.6	2	47.7	Understanding the TCM's philosophy (yin-yan theory, meridians, eight principles, five elements theory) and complexity. Although herbal remedies and acupuncture are the most used, it is necessary to know the role of moxibustion, cupping, massage, mind-body therapy and dietary therapy in the global TCM
23-24	26.3	31-33	20.7	Scarcity of personnel and/or lack of communication between people in Europe who are well trained to address the complexity of CMM and TCM using modern technologies
23-24	26.3	29-30	21.6	Syndrome differentiation in TCM as additional stratification in clinical trials of TCM products to be monitored with measureable biomarkers and PROs
25	25.0	16-18	35.1	A continuous professional development (CPD) programme for training and development of qualified professionals in TCM
26-27	23.7	22	27.9	Not so many strong team work or scientist network in Europe for TCM research
26-27	23.7	16-18	35.1	A harmonised TCM/integrative curriculum: It has been achieved in the medical training system in China and some other Asian countries but is Europe ready and how can we prepare Europe for such an integrative approach of medical training?
28-29	22.4	12-15	36.0	Accreditation of education programmes for training TCM practitioners in the EU
28-29	22.4	12-15	36.0	Lack of rules and registrations suitable for CMM products used as drugs
30	19.7	35	18.0	Close industrial partners' involvement to bridge the funding and technology gap
31	18.4	21	29.7	Nature and scientific meaning of acupuncture points? Do meridians exist? How does acupuncture work, if at all?
32-34	17.1	34	19.8	The almost self-evident complexity of CMMs and the vast skills and collaborations needed to address such complexity
32-34	17.1	7-8	41.4	Recognition of China-trained practitioners in the EU
32-34	17.1	26-27	25.2	Lack of knowledge on allergic reactions caused by CMMs, when used as functional foods
35	15.8	29-30	21.6	TCM diagnosis (Zheng, syndrome or pattern classification) is not well done for CMM research

Supplementary Table 3 - Grand opportunity candidates: Ranking based on percentage of votes received from GP-TCM members and external participants

Ranking				Grand Opportunities
GP-TCM Members		External Participants		
Order	Vote (%)	Order	Vote (%)	
1	75.0	1	82.0	Long-term conditions and chronic diseases are top challenges for Europe and TCM might offer potentially useful knowledge on these diseases and conditions, including ageing, infectious disease, diabetes and obesity
2	56.6	16	36.9	Maturing “omics” and improving systems biology methodologies have offered powerful tools to interpret the complexity and holism of CMM and TCM
3	55.3	4	56.8	Potential positive or negative effects of the combination of drugs from both systems needs to be established
4-5	53.9	18	27.9	With the FP7 GP-TCM funding, an EU-China collaborating forum has been established and good practice guidelines have started to be developed
4-5	53.9	3	59.5	Openness and readiness for EU and China to jointly fund clinical studies including trials and observational studies in both countries/locations
6-7	52.6	8-9	45.0	Bridging modern personalised health (including sub-health condition), with personalised TCM diagnosis and treatment using “omics” and systems biology
6-7	52.6	6	50.5	Chinese government recently announced a \$308 billion biotech industry expansion scheme to create one million new biotech jobs in 2015; EU must come up with new policy and funding initiatives to promote biotech industry especially TCM or herbal medicine projects to attract Chinese partnership and investment
8	51.3	17	33.3	Network based pharmacological evaluation for CMMs
9-10	50.0	14	38.7	China’s open policy and ever increasing funding to scientists in China create good collaborating opportunities
9-10	50.0	2	64.0	Knowledge accumulated through thousands of years of TCM clinical experience provides rich resources for knowledge transfer/education and for understanding and integration of Western and Eastern ideals. The knowledge transfer should eventually benefit healthcare and pharmaceutical industry and education should not be restricted to scientists, it should include industry, the regulators, charities and the public
11	48.7	5	55.0	International cooperation on clinical trial for marketed CMMs
12	47.4	7	46.8	Identification of stakeholders or other special interest groups of TCM for obtaining financial support and other type of collaboration
13-14	43.4	12	40.5	TCM pattern based toxicological evaluation for CMMs
13-14	43.4	8-9	45.0	Attract TCM based novel therapeutics clinical trial projects to EU countries by simplifying regulatory clearance and promoting clinical Excellency centres with EU financial support
15	36.8	10-11	41.4	Openness and readiness for China and EU to engage with large pharma and other agencies to identify commercial opportunities to extend the use of CHM in other markets/areas
16-17	34.2	10-11	41.4	The worldwide rapid development of Confucius institutes/centres, which focus on teaching and research of Chinese language and culture, should provide a useful framework and platform for the research of TCM, as an important part of Chinese culture
16-17	34.2	13	39.6	Sources of CMM: EU/other region/China initiative towards cultivation of medicinal plants outside China, closely monitored with chemical markers/fingerprint profiles
18	23.7	15	37.8	Many other international organisations such as CGCM, GA, ISE, ISCMR, ISCM and IASTAM have offered international platforms for research on various aspects of TCM and complex herbal products