

Research Assessment Exercise 2020
Impact Overview Statement

University: The University of Hong Kong (HKU)

Unit of Assessment (UoA): 6 - Chinese Medicine

Total number of eligible staff of the university in the UoA: 8

(1) Context: Research in this UoA is undertaken within the School of Chinese Medicine (SCM) and the Molecular Chinese Medicine (MCM) programme. Through integration of Traditional Chinese Medicine (TCM) with translational medicine, we elucidate the therapeutic principles of TCM and develop effective and evidence-based healthcare to improve public health and well-being in Hong Kong and beyond. We address fundamental issues through the collaborations of commercial strategic partners (e.g. PuraPharm International (H.K) Ltd, Beijing Tong Ren Tang Chinese Medicine Co Ltd), delivering health promoting products for the benefit of society. Our primary impacts are in the areas of commerce (e.g. Purapharm), the development and delivery of healthcare productions for treatment of major diseases (e.g. new registered drug certificates in Hong Kong for stroke, Beijing Tong Ren Tang Chinese Medicine Co Ltd) and improvement of quality healthcare approaches (e.g. using herbal materials for replacing bear bile to protect endangered species; developing herbal dietary supplement for reducing chemotherapy toxicity, evaluating acupuncture therapy for depressive disorders).

(2) Approach to impact: Our approach to impact is underpinned by a strong commitment to knowledge exchange and translation with academics working directly with the beneficiaries of research, from study inception to implementation. Following actions are applied for the purpose:

(a) Establishing strong relationships with industry: Principle Investigators (PIs) in the UoA actively work with pharmaceutical companies from Hong Kong and Mainland China to develop and patent new drugs and health products from Chinese herbal medicine. For examples, Shen JG's team collaborated with Beijing Tong Ren Tang Chinese Medicine Co Ltd which enabled the School to receive an Innovation and Technology Fund (ITF, UIM/289, 2016) to develop a modified *Angong Niujuan Wan* with nature Borneol for acute ischemic stroke treatment, leading a new certificate of drug registration in Hong Kong and had a new drug certificate registered in Hong Kong (Reg. No. HKC-18100); With the support of ITF fund (UIM/276), Chen JP's team collaborated with Oriental International Health Products Co. Ltd in developing and marketing a tea bag as an herbal dietary supplement against chemotherapy-induced toxicity. MCM Lab collaborated with PuraPharm International (H.K) Ltd on drug discovery research and translate to medicinal granules for treatment in different diseases. In order to maintain the standard of the products, MCM lab trained 3 chemists from industry in the production of new product.

(b) Unit support for knowledge exchange: HKU Technology Transfer Office (TTO) provides supports for transferring research outcome into impacts of health products. Faculty and TTO participate in the IP application with the industries, and to share the benefit with the inventors. This UoA filed 8 patents through TTO and also jointly filed patents with industries (e.g. Purapharm, Beijing Tong Ren Tang). The UoA has long-term collaborations with industries to translate the basic science results to products (e.g. Purapharm for MCM program; Beijing Tong Ren Tang for Prof Shen JG studies for translational stroke research and multiple sclerosis studies). The UoA supports proposal writing and networking with stakeholders. Prof Shen JG and two senior technical support staff assist in regularly reviewing the emerging impacts of research at an individual and research group level. Faculty competitive funds for KE projects enable staff to undertake projects that are underpinning by HKU knowledge and have the potential impact on non-academic sectors.

(c) Developing strong links with clinical partners: The UoA has built strong links with clinical partners from Hong Kong and Mainland China. The UoA has its own clinical centre for clinical trials and Queen Mary Hospital (QMH) provides support for clinical trials. For examples, Prof Shen JG has collaborated with QMH and hospitals from Mainland China for stroke study; Prof Lao LX and Prof Zhang ZJ conduct clinical trials on efficacies of acupuncture for postoperative pain and insomnia patients. The research achievements have been introduced for clinical guidelines. Prof Zhang's two

clinical trials on acupuncture treatment for depressive disorder have been used by Clinical Guidelines Committee of the American College of Physicians for Non-pharmacologic Treatment of Adult Patients with Major Depressive Disorder.

(d) Links with international professional bodies: We prioritize the engagement with professional groups to share research ideas and findings and to promote the adoption of our impactful endeavours. The UoA is the headquarter of Consortium for Globalization of Chinese Medicine (CGCM) which has over 180 member institutions, and actively participates in organizing annual meetings. With Pong Ding Yuen Endowment Fund for Education and Research in Chinese-Western Integrative Medicine, the UoA hosts annual international symposia and invites experts to give lectures for academic exchanges each year. Moreover, our PIs serve as Chair, Vice Chair or Executive Council members for many international professional societies/ committees, e.g. Professor Shen JG serves as Vice Chairman or Executive Council Member in 10 world professional societies, such as the Committee of Diagnostics of Traditional Chinese Medicine, and World Federation of Chinese Medicine Society).

(e) Working with the public: Staffs from the UoA organize or participate public lectures, press interviews, radio and TV programmes to raise public awareness and change public perceptions of the health benefits of our research and/or introduce Chinese Medicine knowledge for disease treatments. For example, in 2017, the UoA's staffs published 19 articles related to Chinese Medicine knowledge for disease treatments in *Oriental Daily*. Professor Lao LX was featured in CNN international, public broadcast television of the United States and Reuters, interviewed by the journal of Nature on Chinese medicine research. A representative study led by Feng YB remarked that an active ingredient of medicinal herb *Copis* named Berberine could replace *bear bile*, a controversial ingredient used in TCM, for human hepatocellular carcinoma. His study made significant impact on protecting endangered species used in Chinese medicine. As a result, the study yields broad social, economic and medical impacts - it aroused public attention to wild animal protection, bear farming business, and promoted the use of bear bile alternative. Professor Godfrey Chan was also interviewed by CNN and different local media on the promotion of Chinese medicine.

(3) Strategy and plans: The University's Vision 2016-2025 is to embed impact into research outcomes. We will make a paradigm shift to focus on and reward research innovations that benefit communities and transform global technologies. This shift will acknowledge material outcomes and leadership in our impact endeavours and add transformational value to the global society. Researchers are encouraged to develop and interact with non-academic stakeholders to discuss the clinical and policy implications of their research from inception to publication, and to optimize knowledge transfer. Researchers are encouraged to undertake translational research with industries by attracting funding from governments and other benefactors. Together with the industries, we interact with non-academic stakeholders to explore the clinical and policy implications of our collaborative research from inception to publication, with a view to optimizing knowledge transfer. Furthermore, these collaborations foster opportunities for postgraduates to gain comprehensive training on product development within the Chinese medicine industry.

(4) Relationship to case studies: The case study of MCM program demonstrated the efforts of the UoA in the modernization of Chinese medicine through collaboration with industries. The MCM programme was developed by professors with western medical training and scientists from different backgrounds. This program started with basic science studies supported by the University and benefactor. Through promotion of the success in initial studies in different meetings and PR events, industries were attracted and collaboration was established on translational studies. Researchers in the MCM program and the industry partner co-owned over 30 international patents, including new compounds identification and their potential use for treatment, modification of production process and quality control of products. With the help of TTO, the results from this program reached out to international pharmaceutical companies and subsequently to the community.