

Herbal Research Direction: Moving Forward to Precision Medicine

To the Editor,

Progress to date in modern medicines relies heavily on the robust outcome of biomedical research resulting in modern drugs which are derived from individual known and highly purified compounds. These drugs are widely used for medical therapeutics on a specific symptom or disease. On the contrary, traditional medicine (TM) has been developed from an extensive collection of the knowledge, skills, and practices based on beliefs and experiences of local cultures and geographical influences.¹ Typically, TM practitioners use a single herb or herbal formula for treatment instead of pharmaceutical drugs. It is estimated that herbal medicine (HM) is used in primary health care by around 80% of the world population.² This is due to the fact that the costs of HMs are much lower than the modern drugs. However, scientific evidences of HMs such as clinical safety, side effect, efficacy, reproducibility and quality are still limited, leading to the need for improving herbal research. In Thailand, there exist enormous knowledge and expertise in Thai traditional medicine (TTM), which is currently being used in several clinical units throughout the country. Therefore, several researchers have started to perform clinical trials on the uses of TTM to examine the efficacy, safety and quality of Thai HM.³ Moreover, studies on

the mechanism of action as well as pharmacokinetics of TM (i.e. reverse pharmacology) will be investigated in different areas. Over the past decade, the number of HM research studies has increased rapidly.² However, most of the research focuses on a specific area of compound identification from herbs or herbal formula that are mostly do not represent the biological activities of HMs that are derived from a complex mixture of thousands of compounds. With advanced technology in chemical identification and data analysis, metabolomics is often applied to identify many compounds or a group of compounds contained in herbs or herbal formulas, enabling us to conduct in-depth study of their bioactivities. Moreover, the proper use of HM in translational practice will need comprehensive biomedical research to support. Therefore, the reverse pharmacology concept is also applied.⁴ Herbs or herbal formulas, which have been used for more than thirty years or three generations⁵, are examined in clinical trial phase 1 and 2 to assure their safety and effects following recommended applications. In addition, *in vitro* and *in vivo* studies to understand the mode of actions of bioactive compounds in HMs will be extremely versatile tools to gain insight into mechanisms and pharmacological profiles. After that, clinical trial phase 3 may be conducted as necessary (Fig 1).

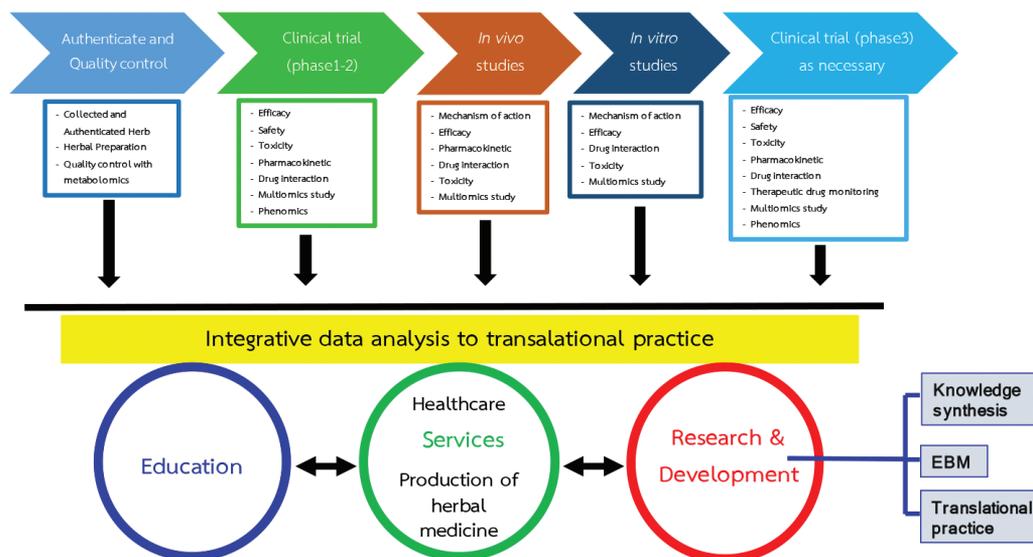


Fig 1. Conceptual framework of herbal research.

Rapid growing application of research in systems biology and systems medicine i.e. genomics, proteomics, metabolomics, and bioinformatics, leads to several discovery stories.⁶ These allow research in TTM including HM to use similar concepts. There will be a massive amount of data derived from both sides of Western and Eastern medicine, with variety of patterns similar to big data system. These will enable us to integrate the complex data to understand personalized patterns in health and disease and lead to precision medical knowledge. In the future, the integration of Eastern medicine and Western medicine data will possibly become the strategy of modern medicine (Fig 2).

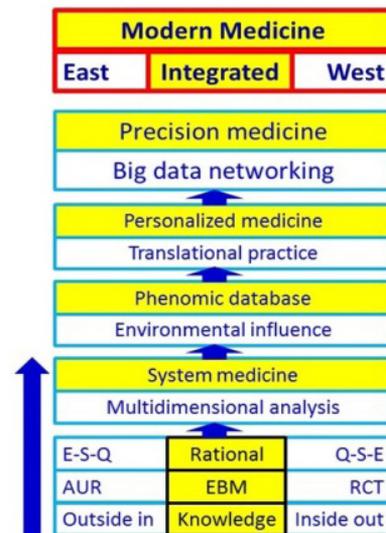


Fig 2. Future strategy of modern medicine.

Abbreviations: E = Efficacy, S = Safety, Q = Quality, AUR = Actual used research, RCT = Randomized control trial

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REFERENCES

1. World Health Organization. General Guidelines for Methodologies on Research and Evaluation of Traditional Medicine. Geneva: World health Organization. [Internet]. 2000 [cited 2017 Feb 02]; 1-71. Available from: http://apps.who.int/iris/bitstream/10665/66783/1/WHO_EDM_TRM_2000.1.pdf
2. Ekor M. The growing use of herbal medicines: issues relating to adverse reactions and challenges in monitoring safety. *Front Pharmacol* 2013;4:177.
3. Akarasreenont P, Datiles MJR, Lumlerdkij N, Yaakob H, Prieto JM, Heinrich M. A South-East Asian Perspective on Ethnopharmacology. *Ethnopharmacology: John Wiley & Sons, Ltd*; 2015. p. 317-32.
4. Vaidya A. Reverse pharmacological correlates of ayurvedic drug actions. *Indian J Pharmacol* 2006;38(5): 311-5.
5. Pittner H. Traditional use of herbal medicinal products – how does it work? [Internet]. 2008 [cited 2017 Feb 02]. Available from: http://www.topra.org/files/2008N06_Focus_01.pdf.
6. Chuang HY, Hofree M, Ideker T. A decade of systems biology. *Annu Rev Cell Dev Biol*. 2010; 26: 721-44.