

## On the Modernization of Traditional Chinese Medicine

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Traditional Chinese medicine has been playing a key role in the development of Chinese nation, in particular, during the ancient period when modern western medicine was not popular in China. Although Chinese medicine is still believed and accepted by Chinese people all over the world, it seems that Chinese medicine is not as state-of-the-art as the fast developed western medicine. Therefore, traditional Chinese medicine needs to be modernized so as to adapt to the demand of contemporary social development.

Modernization of traditional Chinese medicine is to make full use of modern science and technology to study, develop and create safe, efficient, stable and controllable modern Chinese medicine products, meanwhile, to carry forward the advantages and characteristics of traditional Chinese medicine. The key to modernization of traditional Chinese medicine is the standardization and the scientific elucidation of material basis for the efficacy.

Standardization is one of the key bottlenecks restricting the development of modernization of traditional Chinese medicine. Standardization is the guarantee of quality, which has been a well-known rule in the modern society. So, standardization of Chinese medicine including planting, harvesting, processing and marketing lays a good foundation for the production of reliable drugs. From this point of view, many mandatory management regulations such as Good Agricultural Practice (GAP), Good Manufacturing Practice (GMP), Good Laboratory Practice (GLP), Good Clinical Practice (GCP), and Good Supplying Practice (GSP) are necessary for the modernization of traditional Chinese medicine. Another limiting factor of modernization of traditional Chinese medicine is the uncertain material basis of Chinese herbal drugs. Nobody would like to try a drug with unknown ingredients at the risk of health damage, just like the people rarely go into a darkroom without knowing the content inside. Thus, elucidation of the material basis is an essential way to convince dissenters and the unbelieving people from different cultures of the safety and effectiveness of Chinese medicine. As Chinese drugs have complicated chemical composition and multiple acting targets resulting in complex

mechanisms, it is neither easy to establish an efficient quality control standard nor simple to give a comprehensive interpretation of their operating principle. This problem leads to the retardation of Chinese medicine modernization and a small number of people even advocate that Chinese medicine has been self-proved during thousands of years of practice and thus standardization and elucidation are needless.

It is true that Chinese medicine has been demonstrated to be safe and effective by Chinese people, in some extent, at the expense of using human body as screening model during the long history, however, there are still a lot of problems need to be settled, such as the adverse events, poor reproducibility of efficacy, and nonideal processability. Solving these problems still needs standardization and elucidation of Chinese medicine. It has been well known that the chemical composition of Chinese drugs is their material basis of efficacy. With the development of modern analytical technique, for example, Ultra-high Performance Liquid Chromatography (UPLC), High Performance Liquid Chromatography (HPLC), Gas Chromatography (GC), Gas Chromatography-Mass Spectrometer (GC-MS), Liquid Chromatography-Mass Spectrometer (LC-MS) and Nuclear Magnetic Resonance (NMR), it is possible to isolate, identify and control the complex compounds in Chinese herbal drugs. In addition, the development of life and health sciences makes it easy to find various targets on which the active constituents act. Therefore, it is possible to ultimately clarify the material basis of traditional Chinese medicine and make it standardized.

Modern science and technology provide favorable conditions for the realization of the modernization of traditional Chinese medicine. Currently, many high-tech and modern research method have been applied to the modernization of traditional Chinese medicine research, but it should be noted that not every new technique and new method are appropriate for the study of traditional Chinese medicine and modernization of traditional Chinese medicine must make a reasonable use of modern technology while inheriting traditional advantages.

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