

## Translational medicine in China I: Perspectives from Chinese physicians and scientists

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Ever since Dr. Elias Zerhouni, then director of the National Institutes of Health, proposed “The NIH Roadmap” in 2003 [1], life sciences and medical fields worldwide have emphasized translational medical research. In this special topic, we have invited distinguished physicians and scientists to offer their perspectives on translational medical research in China.

Minister of health, scientist, and physician Dr. Chen Zhu, invited by our general editor Prof. Zhu ZuoYan, indicates that translational medicine is a people-oriented medical practice (focusing on patients and the general population). While rapid industrialization and urbanization have brought challenges to China’s health system, Dr. Chen predicts that the development of translational medicine will accelerate disease control and health solutions with an emphasis on proper principles.

Echoing Dr. Francesco Marincola’s “Translational Medicine: A Two-Way Road” [2], Dr. Zhong NanShan, a physician and scientist specializing in respiratory diseases who made significant contributions during the 2003 SARS outbreak, welcomes the impressive development of translational medicine from the traditional “bench to bedside” and “empirical to evidence-based” practice to a practice of “bedside to bench to bedside.” He describes three successful cases of translation from traditional Chinese medicine: the use of artemisinin in the management of malaria, the use of arsenic in the management of leukemia, and artificial infection with malaria parasites for lung cancer therapy.

A scientist and physician in the field of cardiovascular disease, Dr. Liu DePei reviews classical stories of patient-oriented translational medicine, from the Framingham Heart Study to the development of statins to percutaneous coronary intervention treatment. Prof. Liu, the president of the Chinese Academy of Medical Sciences and Peking Union Medical College, notes two important aspects of translational medicine—translational medical research centers and talents—and summarizes the current situation in China. Prof. Liu proposes that “9P-3P” medicine should guide the development of translational research.

Adenomatous polyposis coli may have been the first gene to be linked with translational medicine by James Geraphy in 1996 [3]. Dr. Zeng YiXin, oncologist and president of the Cancer Hospital Affiliated with Sun Yat-sen University, summarizes recent advances in molecular targeted tumor therapy in China, which may be the practice that has benefited most significantly from translational medical research. Dr. Zeng foresees that “looking for targets more specific to tumor cells” and “individualized therapy under the guidance of molecular markers to improve the effectiveness of treatment” shall be the future trends.

Although translational medicine seems to be a new discipline, the understanding of its effects can be traced to Dr. Liu Shih-Hao, the founder of endocrinology in China, in the early part of the last century. Dr. Li NaiShi, a physician from Peking Union Medical College Hospital, discusses the application of translational medicine in the research, teaching and clinical work of Dr. Liu, who is particularly re-

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nowned for his early work in calcium and phosphorus metabolism. Dr. Liu Shih-Hao's early translational medical research work "Treatment of renal osteodystrophy with dihydrotachysterol (A.T. 10) and iron" published on *Science* in 1942 was still cited last year by Dr. S. M. Moe in his book *Definition and Classification of Renal Osteodystrophy and Chronic Kidney Disease-mineral Bone Disorder* [4].

Translational medicine aims to bridge basic science research and clinical practice. In recent years, China has published many important discoveries related to the research of translational medicine. Some of the major themes touched by these publications include: research into mechanisms of diseases with the aim of identifying new therapeutic targets or improved therapeutic strategies [5–18], "omics" approaches to human diseases [19–26], testing of new therapeutic methods in animal models [27–31], research into the mechanisms of host immune defense against infections [32–48], and regenerative medicine-related research [49–57]. However, our understanding of human diseases remains limited, the move from bedside to bench must continue to be pursued.

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