

## Introduction

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Received: 27 August 2007 / Accepted: 30 August 2007 / Published online: 3 October 2007  
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**Abstract** The edition of a special issue entitled “Neuroscience in China” provides a unique opportunity to introduce neuroscience research undertakings in China today. Among the biological sciences at large, neuroscience is one of the most advanced fields in China. To take two examples, more than 70% of the articles published in the Chinese Journal of Physiology were in the category of neuroscience; among the members of the Chinese Academy of Sciences (CAS), scientists in the field of neuroscience outnumber scientists in other disciplines of basic medical sciences. This essay tries to analyze the historical and contemporary background underlying the current status.

**Keywords** Neuroscience · China

### Two Great Movements in the Recent Half Century

At the very beginning of the establishment of new China in 1949, the leading policy was to learn everything from the USSR, including science and technology. In terms of physiology and biology, the Pavlov theory of conditioned reflex was the dominant theory to be studied, partly because it stressed the importance of environmental rather than the congenital factors in the formation of human cognition. In the 1950s, almost every department of physiology in every medical college had a sound-proof laboratory for conducting experiments of conditioned reflex. This constituted the basis of attracting people’s interests in behavioral neuroscience.

Another movement was the study on acupuncture anesthesia (AA). Acupuncture has been used for the treatment of pain for thousands of years in China. At the end of 1950s, a group of medical professionals tried to use acupuncture for the prevention of pain produced by

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surgical procedures and obtained some success in reducing anesthetic use, hence came forth the term AA. The practice of AA was encouraged by the medical authorities. Researchers of basic medical sciences were also encouraged to answer “why acupuncture works to reduce pain”. This movement attracted great interest in neuroscience on pain, especially during the years of “cultural revolution” (1965–1975), when most research projects were stopped. However, research on acupuncture and pain was one of the few research areas that survived the turmoil.

### **Two Great Scientists of Neuroscience**

TP Feng (冯德培) and HT Chang (张香桐), born in the same year of 1907, are the two great figures responsible for promoting the development of neuroscience in China in the past century. Feng received his training in US and UK, and started his own research on neuromuscular physiology at the Peking Union Medical College (PUMC) in Beijing in 1934. He served as the director of the Institute of Physiology, CAS in Shanghai for more than 30 years. Chang was trained in Yale University, US. He returned to China in the mid 1950s, worked at the Institute of Physiology for more than 20 years, and founded the Institute of Brain Research in Shanghai in 1980. These two institutions have been the training bases of neuroscientists, especially electrophysiologists, in China. In fact, most trainees from the electrophysiology courses given by Chang and his colleagues in the 1950s and 1960s later became the chairpersons of the departments of physiology in a majority of medical colleges in China.

### **Two Systems of Organizations**

The Chinese Academy of Sciences and the universities under the Ministry of Education were the two major organizations pursuing neuroscience research in China. The Institute of Physiology and the Institute of Brain Research of the CAS were no longer existed, giving way to the Shanghai Institute of Neuroscience (ION), directed by MM Poo from the University of California, Berkeley. This is a new institution applying the principles of organization and management used in most western countries. Strongly supported by the CAS and the Ministry of Science and Technology (MST), the ION has been able to recruit well established scientists who were trained abroad and returned to China. The institute has achieved rapid development since its establishment in the autumn of 1999, with an aim of doubling the current size of 15 labs to 30 in 2010. Another major research institute related to neuroscience is the Institute of Biophysics, CAS, in Beijing. Founded in 1958, this institute emphasizes structural biology, brain imaging and cognitive neuroscience.

Universities in China are under the auspice of the Ministry of Education. Most universities undergo neuroscience research and teaching. The course of neurobiology which was optional for medical students for many years is becoming mandatory in some universities. The neuroscience program in three universities has been selected by the Ministry of Education to be the key program, signaling their high quality of teaching and in-depth research, i.e., Fudan University in Shanghai, Peking University Health Science Center in Beijing and the fourth Military Medical University in Xi'an. Neuroscience research in these institutions is more or less translational, closely related with practical application, e.g., pain, vision, drug abuse and CNS diseases and injuries.

## Two Sources of Funding

The major funding for basic research in China comes mainly from two sources, the National Natural Science Foundation of China (NNSFC) and MST. In principle, the NNSFC funding is more general and the MST funding more targeted. However, NNSFC also has some central programs supporting major projects, including neuroscience, cardiovascular diseases, malignant diseases, etc. The MST funding is divided into two divisions, one is concentrated on very basic sciences (the sciences), and the other is on practical issues, including the development of modern technologies (the applications). Neuroscience has both theoretical and practical impacts, therefore it is supported by both sources. While the baseline research funding level in China is low as compared to most developed countries, the annual increase was dramatic and impressive. Although there is no published data, as a scientist in China, you can feel that the annual increment must be over 15% in the recent 5–10 years. This is often appreciated by visitors coming from countries experiencing research budget cutting for consecutive years.

As the editor-in-chief of the third edition of the neuroscience textbook in Chinese to be published in 2008, I fully understand how much the Chinese neuroscientists at home and abroad have contributed to the progress of neuroscience in the world today. We have all reasons to hope that Chinese neuroscientists will have more opportunity to flourish on their own soil in the future.