



Prof. Shun Lu: to be a leader with clear target in lung cancer research

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In recent years, lung cancer has become one of the scariest diseases due to its high morbidity and mortality. Are there any breakthroughs in the preclinical and clinical research on the treatment of lung cancer? What are the challenges? What has Shanghai Chest Hospital (SCH), a leading institution in the management of lung cancer, done in this field? With these questions, we interviewed Dr. Shun Lu, a senior physician with rich experiences in the diagnosis and treatment of lung cancer.

Academic developments and talent training

Dr. Lu was full of pride when he talked about the history of the Oncology Department in SCH. The Oncology Department was founded under the leadership of two highly respected predecessors—Dr. Meilin Liao and Dr. Yunzhong Zhou. Early in 2000, Liao and Zhou recognized that tumor therapies were not the task of single discipline. This foresight promoted the construction of the Oncology Department, which was finally established in 2006. The department enabled the true integration of medical oncology with surgical oncology, achieving the construction of multi-disciplinary teams. As the youngest major department in SCH, the Oncology Department has developed rapidly since its founding: the number of annual surgical operations and procedures was only 500 in 2006 but exceeded 2,500 in 2016; the number of inpatients in the medical oncology division increased from 2,000 in 2006 to 9,000 in 2016; research projects in the Oncology Department were initially only supported by the municipal programs, but nowadays there are National Major Research Program-supported projects; an increasing number of scientific articles from the department have been published in SCI-indexed journals, and the annual accumulative IF score has reached over 40. These figures have witnessed one milestone after another reached by the Oncology Department, behind which the overall scale and staff capability of the department are advancing considerably.

After over 10 years of construction, as a qualified, skilled, and committed team, the Oncology Department has taken a lead in lung cancer management in China.

As the director of Oncology Department, Dr. Lu has solid knowledge and skill in both medical and surgical oncology. Dr. Lu believes that there are two priority tasks for surgical oncology: one is organ transplantation (lung transplantation) and replacement of artificial organs, and the other is minimally invasive surgery. The Oncology Department has many talents in these two areas. Dr. Qiang Tan, who has finished his MD and postdoc training at the University of Zurich, Switzerland, has a thorough knowledge of tissue engineering. He has successfully performed artificial tracheal transplantation, and regenerative medicine is also his research interest. Dr. Qingquan Luo performed the first case of robotic surgery for lung cancer with the Da Vinci system. With solid knowledge and skills in this field, he has been in the forefront of surgeons performing minimally invasive surgery in China. Dr. Lu also emphasized the role of translational medicine in medical oncology. Efforts should be made to promote the establishment of clinical immunologic targets and the implementation of precision medicine. In addition, tailored therapies based on gene medicine and clinical tumor immunology should be constantly explored to maximize the therapeutic effectiveness.

Also, Dr. Lu shared with us his views on the training of young doctors in the Oncology Department. Dr. Lu said, pleasantly but sternly, “First, young doctors must follow medical ethics. They must have benevolence, dedication, and willingness to serve the patients. Second, they must have the abilities and skills required in clinical practice. Thus, the managers and mentors of SCH should provide a good learning environment for young staff by developing systematic training plans and offering clear research directions. With clear goals and visions, young doctors will grow more rapidly, so that the hospital will have more talents who can lead its future development.”

From follower to player

Lung cancer treatment has undergone tremendous changes and innovations over the past two decades. From 1995 to 2005, it had been found that chemotherapy without individual characteristics developed very slowly and was not the future direction of lung cancer treatment. Meanwhile, specific targeted therapies had become the mainstream treatment strategy for lung cancer. Since 2015, immunotherapy has become a new and most promising treatment. As the director of Oncology Department, Dr. Lu became keenly aware that genomics has been gradually applied to the clinic when the TCGA project was initiated in the United States. He promoted the clinical and translational studies on genomics, with a focus on the tailored treatment of lung cancer. According to Dr. Lu, the era of “trial and error” of chemotherapy has passed, and research on biomarkers represents the future direction of lung cancer management.

By keeping a close eye on the international advances in lung cancer research, the Oncology Department has done a great deal of researches in this field. Recently, Dr. Lu and his team has published an article on the rapid identification of tumor cells in body fluid samples in the Proceedings of the National Academy of Sciences of the United States of America. As described in the study, this new method is superior to Cellsearch CTCs testing technology developed by Veridex, LLC, a subsidiary of Johnson & Johnson. This new technique has many advantages in detecting circulating tumor cells. The Oncology Department also participated in the global LUX-Lung 8 study to investigate the standard second-line treatment for advanced squamous cell carcinoma of the lungs. This study was registered in the United States, and the patient data provided by SCH were also examined by the US FDA; as a clinical trial with indications in China, it was quite meaningful for Chinese patients. In addition, the Oncology Department has also participated in many international multicenter clinical trials on adjuvant therapy. Based on its rich research experiences in lung cancer, the Oncology Department of SCH has conducted many clinical trials of agents for lung cancer to support drug registration. The Oncology Department has long been committed to changing the standard treatments for lung cancer and modifying relevant guidelines in China. Internationalization is the gateway to success for clinical studies in China.

If lung cancer research in China can be divided into three stages, according to Dr. Lu, SCH had been a follower

in this field from 1999 to 2009. Before 1999, China neither had established its State Food and Drug Administration (SFDA) nor has adopted the good clinical practice (GCP) principles, and thus the clinical trials were not in accordance with international norms. In 2009, Yilong Wu and Shujin Mo published the results of the IPASS study, which explored the role of gefitinib in the treatment of non-small cell lung cancer, in the *New England Journal of Medicine*, which opened a new chapter in molecular targeted therapies for lung cancer, changed the global standard treatment for global lung cancer, and also marked that the studies on lung cancer in China had entered a fast lane. During this stage, we were still learning from developed countries, without our own experimental design or voice. Fortunately, in the stage from 2009 to 2019 Chinese researchers have become active players in the diagnosis and treatment of lung cancer. Chinese scholars have participated in the design of many important international research programs, and some of them have served as principal researchers. In 2016, Yilong Wu and Shujin Mo's study on the role of osimertinib (AZD9291) in treating gefitinib-resistant non-small-cell lung cancer with T790 mutation was again published in the *New England Journal of Medicine*, marking a big step in Chinese scholars' research on lung cancer.

“After the year of 2019,” said Dr. Lu firmly, “China will play a leading role in lung cancer research.” Looking back to the road ahead, Dr. Lu believes the preclinical and clinical studies of lung cancer in China are on the right track.

With a clear understanding of the gaps, be a leader in lung cancer research

Dr. Lu has been trained in multiple foreign centers for many times and he has a clear understanding of the gaps between Chinese oncologists and their counterparts in developed countries in terms of the integration of experiments with clinical practice or the diagnostic ideas. Some of the oncology departments in China still have the following problems: improper developmental directions, imperfect experimental conditions, poor integration of research with clinical practice, and immature innovation conditions. In terms of diagnostic idea, most oncologists in China treat tumors based on the result of one single biopsy. However, several important articles in the recent issues of *New England Journal of Medicine* have stressed that it is important to carry out dynamic observations on the change of a specific tumor during its treatment and thus adjust

the treatment planning. In China, no clear and systematic concept or practice has been available in this regard. Therefore, on the basis of an accurate understanding of the advances in lung cancer research, we should strive to achieve precision medicine. Precision medicine, with “precision” as its focus, should be implemented in clinical practice. With clinical work as the central task and guided by clinical needs, we should be committed to carrying out studies that can change clinical practice and truly implement the concept of “from bench to bed and from bed to bench”. As long as we are guided by the right concept and ideas, we will not only become a big country in lung cancer research but also become a powerful leading country in this field.

When asked about his expectations on *Shanghai Chest*, Dr. Lu hopes that this journal can learn the advantages and strengths of top international journals, find its suitable development mode, and strive to publish high-quality articles. Thus, the journal will gradually find its own position among thoracic journals.

From “follower” to “player” and then to “leader”, this long journey has witnessed China’s profound changes in treatment and clinical research in lung cancer, during which many top oncologists like Dr. Lu have overcome many difficulties and completed a lot of key tasks. By insisting on its original vision and facing the coming challenges, the Oncology Department of SCH will continue to shine in the world and the lung cancer treatment and research in China will be further optimized.

Profile

Shun Lu, chief physician, professor, director of Lung Cancer Center of SCH, professor of Shanghai Jiao Tong University, doctoral tutor. His honorable titles include “Shanghai Medical Leading Talent” and “Shanghai Outstanding Academic leader”. He had been trained in the United States and Israel, with certificates of completion in oncology. He is particularly interested in medical oncology, with rich experiences in the early diagnosis, multidisciplinary treatment, and translational study of lung cancer. He has been the principal investigator (PI) or co-PI of many national and municipal research projects. In addition to the studies supported by the National Natural Science Fund of China, he also served as the first PI for the sub-project of the national 863 project “Molecular typing and individualized diagnosis and treatment of lung cancer” in 2007 and 2012. In 2017, he participated in the

national “11th five-year” Science & Technology Support Program; in 2012, as the first PI, he undertook the Ministry of Science & Technology international cooperation project “Sino-Swiss Cooperative Translational Medical Research on Key Technology of the Diagnosis and Treatment of Lung Cancer in Lung Cancer Medical Centers”. In 2016, he acted as the PI of the sub-project of Ministry of Science & Technology research project “Research on the Prevention and Control of Major Chronic Non-communicable Diseases”—Construction and Verification of the Prediction Index of the Curative Effect of Immunotherapy for Lung Cancer Based on the Omics Features. He also serves as the member of the international affairs division of the American Society for Clinical Oncology (ASCO), chairman elected of the Professional Committee of Lung Cancer under the Chinese Anti-Cancer Association, deputy secretary-general and managing director of Chinese Society for Clinical Oncology (CSCO), and chairman elected of Shanghai Society of Oncology. He also is the deputy editor-in-chief of the *Journal of Thoracic Oncology*, the official journal of International Lung Research Association. Also, he is the member of the editorial boards of other top journals such as *The Oncologist*.

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