

Training and Retaining Physician–Scientists in Dermatology: China

Gang Wang¹



Physician–scientists play a crucial role in the development and advancement of medical science. The number of physician–scientists has been decreasing in recent years, and this phenomenon is also very prominent in the field of dermatology. In China, on the one hand, the quality and quantity of dermatological science research are rapidly increasing. On the other hand, there are many problems and challenges in physician–scientist training that hinder young students from choosing to enter an MD–PhD path over an MD-only path. Continuous efforts should be made to attract medical students to the dermatology specialty, to guide and spur their interests in scientific research, and to provide them with excellent research conditions and environment.

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Physician–scientists are specialists who function both as clinicians and scientific researchers, playing a key role in unwrapping new discoveries that help to understand human health and disease and then translating them into new therapeutic approaches. The number of physician–scientists has been dwindling in recent years, particularly in the field of dermatology, and the reasons for this are complex and have been thoroughly analyzed in a study by Li et al. (2021). In China, the situation of physician–scientists in dermatology is similar to that of the United States in part and has its own special problems.

Dynamic growth of scientific research in dermatology

The scale of scientific research in dermatology is growing rapidly in China. An important indicator of this fact is that the number of English articles in PubMed increased over the past decade (2009–2019) from 147 to 1,337, as published by Chinese dermatologists. Especially, the number of

articles published by Chinese dermatologists in the *Journal of Investigative Dermatology*, which may better represent basic research, has been also growing rapidly, from just a few in 2009 to >20 in 2019 (Uitto et al., 2020). The National Natural Science Foundation of China (NNSFC) is the main national research foundation supporting basic research in China, and the number of NNSFC projects awarded to dermatologists has increased from 67 in 2012 to 127 in 2021 (Figure 1a, data from the NNSFC website: <http://www.nsf.gov.cn/>), which is another convincing proof of the continuous growth of dermatological science research. Most of the research work is conducted by faculty members working at dermatology departments in university hospitals after obtaining a PhD or postdoctoral training. Receiving scientific training and engaging in scientific research not only boosts physician–scientists' research interest as well as the ability to identify and solve clinical problems but also benefits them to form their own advantage in subspecialties

because most physician–scientists have their research interest and clinical expertise in the same field, focusing on the same type of diseases. One new phenomenon in dermatological research in China over the past decade is that the dermatology departments in some universities have started to build a team of full-time basic researchers. Our department, as an example, has been recruiting and training basic researchers since 2009. Currently, their number has reached 23, some of whom have grown into research professors or associate professors; the Dermatology Hospital of Southern Medical University (Guangzhou, China) has matriculated >10 basic researchers in the past 6 years. These full-time researchers formed a team with dermatologists, postdoctorates, and postgraduates, playing an active role in improving the research quality, guiding young doctors in scientific research, and mentoring postgraduates (Figure 1b).

Challenges in dermatology physician–scientist training

Despite the flourishing momentum in dermatology research in China, fostering a talented physician–scientist workforce is also a challenge. In China, unlike in the United States, dermatology is not a priority for medical students, if not among the last choice on their specialty application. They prefer more challenging specialties of surgery or internal medicine, partly because most well-trained doctors in China work for public hospitals; surgical and internal medicine promise students with a wider range of options and more opportunities for employment. Then, the number of medical students who have chosen dermatology further drops when they choose to enter the MD–PhD path. Young students are more willing to choose the MD-only path and then pursue clinical practice, whereas only a few are willing to continue their scientific research. I personally encountered such a situation: at the beginning of this year's admission, at least five outstanding students from various universities contacted me and expressed great desire to study in my department, but when they learned that I wanted them to enter the MD–PhD

¹Department of Dermatology, Xijing Hospital, Fourth Military Medical University, Xi'an, China

Correspondence: Gang Wang, Department of Dermatology, Xijing Hospital, Fourth Military Medical University, 127 Changlexi Road, Xi'an, Shaanxi 710032, China. E-mail: xjwgang@fmmu.edu.cn

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COMMENTARY

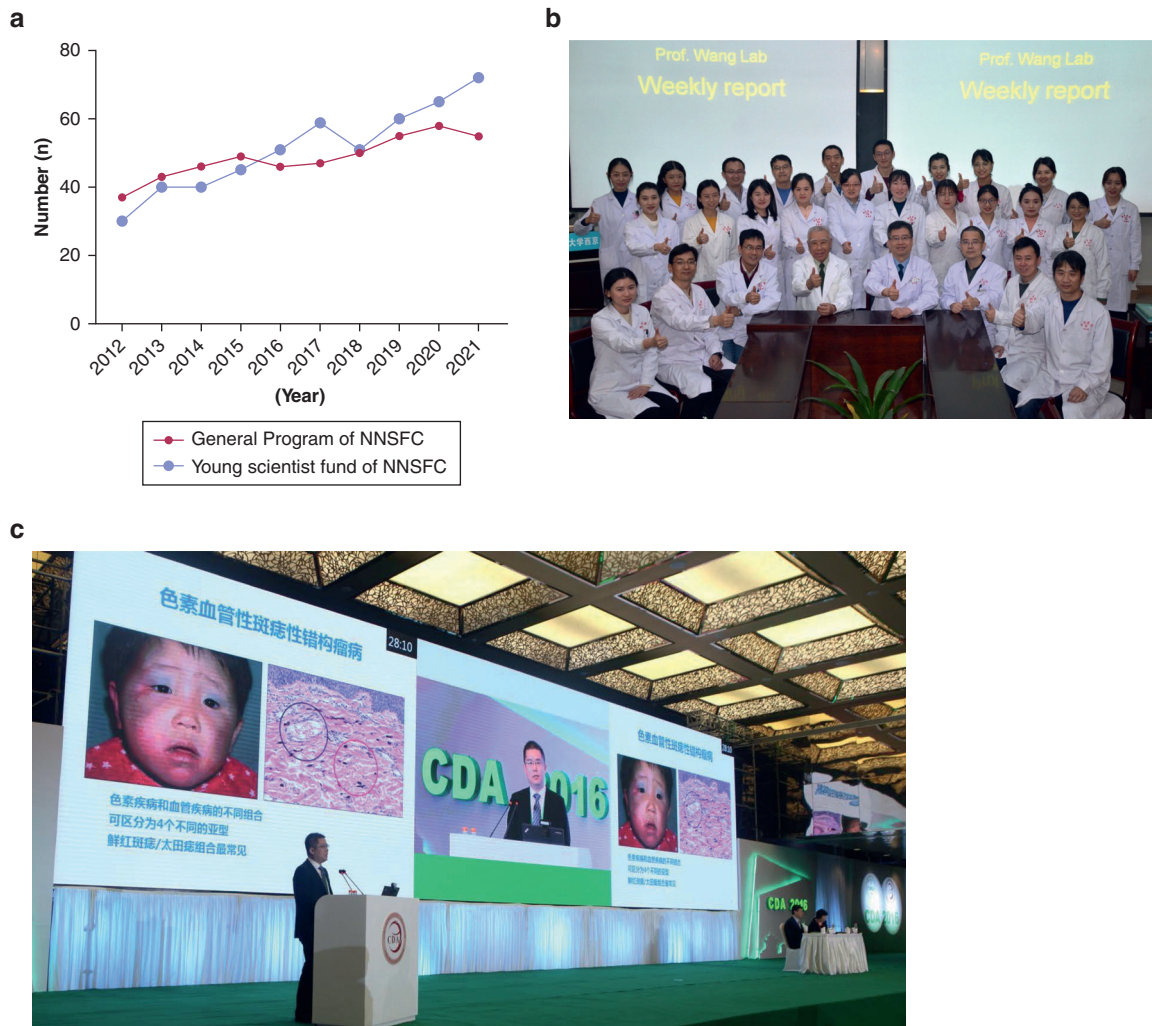


Figure 1. Dermatological scientific research and physician–scientist training in China. (a) The number of projects in dermatology funded by NNSFC has increased steadily over the past decade; (b) A research group of the dermatology department at Xijing Hospital (Xi’an, China), integrating dermatologists, researchers, postdoctorates, and postgraduates; (c) A young dermatologist, Lei Wang, was presenting a Hu-Yang memorial speech at the annual meeting of the CDA. CDA, Chinese Dermatologist Association; NNSFC, National Natural Science Foundation of China.

path, only one of them eventually chose to stay, whereas the others opted for an MD-only path at other universities.

This phenomenon, on the one hand, reflects the low interest of many young clinicians in scientific research driven by their pressure for career advancement; on the other hand, it is also caused by the lack of policy incentives for MD–PhD. Choosing to be an academic physician who pursues a career integrating clinical practice and scientific research requires more effort and time, but the salary package is not advantageous in return. In a survey of MD-only and MD–PhD students who expressed interest in research careers, Kwan et al. (2017) found that raising children was the most frequently reported concern when it came to

pursuing a career as a physician–scientist. It is interesting to note that with the restructuring of China’s family plan policy in recent years, raising children is becoming another important factor influencing Chinese dermatologists’ career plans, which was almost unaccounted for in the one-child-only period. Finally, the current quantity and quality of private practice in dermatology are comparatively weaker because it is estimated that only <5% of dermatologists choose to enter private practice at some point in their career. This situation is changing as private practice grows and matures. Entering private practice for higher income is becoming more attractive and will be a potential factor further decreasing the number of physician–scientists in the future.

Efforts to attract and educate dermatology physician–scientists

How to attract medical students into the dermatology program is a big challenge. I agree with Li et al. (2021) that early contact between faculty and students is a very effective tool. Besides that, offering dermatology-related optional courses and research seminars, offering lecturers that elaborate the importance of skin to the human body, introducing research achievements gained by the department and the clinical problems they solve, and explaining the relevance of important scientific advances to dermatology in the classroom can definitely help to stimulate students’ interest in dermatology. Interest is the best teacher. The Nobel Prize in Physiology or Medicine in 2021 was awarded to David Julius

and Ardem Patapoutian's study related to skin physiology and dermatology (Burki, 2021), which will undoubtedly inspire more medical students to devote themselves to dermatology.

Success stories are the most attractive. Efforts to support and help students who have chosen dermatology and entered the MD–PhD path to succeed are the best way to attract more students behind them. Department chairs, mentors, clinicians, and researchers all have responsibilities in attracting and developing physician–scientists. There is no doubt that the departmental chair is essential in creating an environment conducive to research, providing conditions and incentives, identifying potential candidates, and encouraging them to become future leaders; the mentor should be able to distinguish between students who enjoy doing research and those who do it for use and should try to guide students and support them in the process of mentoring so that they find research interesting and rewarding. The position of full-time basic scientists was almost absent in Chinese dermatology 10 years ago. Now working together with dermatologists, they not only optimize the technical platform and improve the productivity and quality of research but also continuously stimulate the dermatologists' will to become physician–scientists. It is expected that this practice will be put into place in many Chinese dermatology departments in the future.

How to effectively train physician–scientists and sustain them in continuous scientific research is another great challenge. We conducted a survey on the current status and needs of dermatologists' career development through the internet in December 2020. A total of 3,899 physicians responded to the questionnaire, of which 24% wanted to have opportunities for further study and advancement in scientific research (data not published), indicating that a significant proportion of Chinese dermatologists are still interested in scientific research, and thus there is still a lot of room for training physician–scientists among dermatologists. The training of physician–scientists is indeed receiving more and more attention; government and university research funds are

dedicated to programs, especially for young physicians. In the 2021 NNSFC, for example, there were 72 youth projects out of a total of 127 projects in the field of dermatology, accounting for 56.69% (Figure 1a, data from the NNSFC website: <http://www.nsf.gov.cn/>). Access to research funds is undoubtedly an important guarantee for young dermatologists to continue their scientific research. Academic dermatology organizations are also making efforts, including raising research funds, offering relevant training courses, and sponsoring young dermatologists in participating in international meetings. The Annual Meeting of the Chinese Society for Investigative Dermatology, an English-speaking conference focused on the latest progress on basic research in investigative dermatology, has become an important platform for communication among Chinese dermatology researchers and between international peers (Uitto et al., 2020); the Annual Meeting of the Chinese Dermatologist Association is the largest annual dermatology meeting in China, with two special presentations in memory of Hu Chuankui and Yang Guoliang at the opening ceremony. One of them is dedicated to inviting young and middle-aged physician–scientists to present their clinical and basic research as well as their life story (Figure 1c), which has become a great inspiration for both young dermatologists and medical students.

In the future, the training of physician–scientists in China should emphasize institutional reform, in which doctors who are really interested in scientific research rather than those who are forced by professional promotion pressure can get into the training program. Besides, in the current residency program, there is no dedicated training slot to scientific research, which may become a direction for improvement. In China, physician–scientists in dermatology are more concentrated in large central cities such as Beijing, Shanghai, Xi'an, Nanjing, and Guangzhou; the training of physician–scientists is also mainly conducted in these cities at top-ranked universities. It would be valuable for these training institutions to design and incorporate certain training courses on

developing research interest and experimental research in their residency programs, and it is undoubtedly crucial for the government, universities, and other administrations to provide more opportunities in terms of employment, promotion, and salary to encourage physician–scientists. One of the most competitive programs in the NNSFC grant, the Outstanding Youth Fund, has extended the maximum age limit for female applicants by 2 years, which is very beneficial to alleviate the competition faced by female physician–scientists. This practice provides a good reference for other scientific programs and employers. Finally, although international academic exchanges are currently very restricted by the COVID-19 pandemic, Chinese dermatology should still try to strengthen the international training of young doctors in the future so that more dermatologists will have the opportunity to be trained at the top dermatology departments around the world and so that they will have broader horizons and will be more willing to commit to a career as physician–scientists.

ORCID

Gang Wang: <http://orcid.org/0000-0002-5842-8080>

CONFLICT OF INTEREST

The author states no conflict of interest.

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