

# Training Physician–Scientists: A Call for a Cultural Shift in Our Approach



*“Joy of discovery is real and it is one of our rewards”*

*Henry Taube, Nobel Prize in Chemistry, 1983*

The training of physician–scientists has been an area of emphasis and concern in the United States since the authorization of the National Institutes of Health (NIH) in 1930 (Lathrop and Flattau, 1994). The Ransdell Act formally charged the NIH to recognize the training of scientists as a major responsibility. In 1937, the National Cancer Act first authorized disease-specific fellowships at the NIH or at other institutions (Lathrop and Flattau, 1994). These efforts in support of training young scientists expanded after WWII, and in the 1950s, institutional training grants were developed. By 1969, 16,000 individual trainees were supported through the NIH (Lathrop and Flattau, 1994). In 1964, it was acknowledged that there was a need for investigators trained both in clinical medicine as well as in research skills, and the Medical Scientist Training program was launched. This program provided support for individuals to train simultaneously for MD and PhD degrees. This commitment to train physician–scientists was challenged in 1974 when the federal budget proposed eliminating all new training and fellowship grants. Congress responded by passing the National Research Service Award Act, which consolidated all research training and fellowship awards in a single authority (Lathrop and Flattau, 1994). The support of the training of young investigators continued to expand over the ensuing years, accompanied by multiple recommendations by advisory groups calling for increasing the level of support for fellowships and research training (Lathrop and Flattau, 1994).

Despite this increase in the awareness of the need to support physician–scientist training, it became apparent in the 1970s that the number of physician–scientists was dropping (Lathrop and Flattau, 1994). Beginning in 1977, the National Research Council described some potential explanations for this decline (Lathrop and Flattau, 1994), including the following:

1. the risk of failing at an untried field after demonstrating the ability to succeed in medical practice;
2. the loss of income as compared with practice;
3. a growing perception among students that patient care has greater value than research;
4. social pressure on students to enter primary care fields; and
5. an image that paperwork and red tape inhibit researchers more than in the past.

Over the ensuing decades, the literature is filled with commentaries directed at how to attract and train physician–scientists, how to retain bright and committed young physician–scientists, and warnings that we must act now to avoid significant damage to the country’s future health and welfare (Castle, 1976; Hollenberg, 1969; Martin, 1991; Mirmira, 2014; Wyngaarden, 1979; Zerhouni et al., 2016). In addition, numerous task forces outlined recommendations to the government to address this issue (American Academy of Arts & Sciences, 2014; National Institutes of Health, 2014; Salata et al., 2018). The solutions proposed have remained remarkably constant over the years. These recommendations often include increased public promotion of the need for biomedical research to ensure medical advances, increasing funding for training and for the initial support of the research of young investigators, relieving the debt burden on young physician–scientists, and decreasing the time of training and time to achieving independent funding. Many of these proposals have been implemented in part or, in some instances, entirely with variable degrees of success, yet the problem remains. We are still facing “The Clinical Investigator as an endangered species” as stated by Dr James Wyngaarden (Wyngaarden, 1979).

For the most part, these recommendations have been macro solutions. It is difficult, if not impossible, for individual investigators or academic institutions to increase funding for research training across the entire spectrum of medical specialties. Likewise, to forgive medical school debt and provide sufficient funding to support early-career grants for all early research faculty cannot be undertaken by medical schools or private philanthropy alone. Certainly, most medical schools provide some support for

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research training and career development, which is needed and meaningful. It is also clear that for dermatology to have a robust research base, national programs, supported by governments, will continue to be needed. It is therefore imperative that we support and advocate for ongoing governmental support for these goals. Nevertheless, the shortage of physician investigators over the last 5 decades has persisted, despite aggressive advocacy and increasing NIH budgets. It is clear that more needs to be done. How can we as individuals and our individual departments and scientific societies help to promote the recruitment, training, and long-term success of physician–scientists?

Recently, *JID Innovations* published a provocative and timely article by Li et al. (2022) focused on training physicians for careers in investigative dermatology in the United States. Li et al., (2022) clearly define the importance of physician–scientists in dermatology, and they surveyed the opinions of educators and physician–scientists in dermatology about the current state of training. They propose a framework for enhancing the recruitment, training, and ultimately retention of young physician–scientists in the academic workforce. Whereas they describe the macro needs such as increased funding for training and early-career independence, they also point out the need for a cultural shift to re-emphasize the importance of clinician-guided science.

The need for increasing the number of physician–scientists in the dermatology and skin biology community reaches beyond the United States. Casual conversations with inter-

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national dermatological colleagues indicate that the future of physician–scientists in dermatology is at risk worldwide. In the spirit of the international collaboration that is so vital to the advancement of science, it seemed that we could all benefit from learning about how other countries and cultures address the problem of trainees' declining interest in pursuing careers as physician–scientists.

We asked physician–scientists from around the world to comment on the work of Li et al., (2022). We posed two questions for them to address: (i) Is there a crisis in the training of physician–scientists in dermatology in your country? (ii) If so, how are you and your institutions seeking to solve this problem?

In reading these commentaries, it is clear that we are all facing a daunting problem and that we share many of the same challenges. We are all losing young trainees to the more lucrative private practice of dermatology. All of our trainees face the challenges of the demanding lifestyle of being both a clinician and an active scientist—and the impact of that lifestyle on their families. All of our trainees must deal with the long training that is part of becoming a dermatologist, coupled with the rigors of scientific training, only to then face the uncertainty of funding and achieving a successful scientific career. Indeed, there seems to be little difference in the

issues of today from those that were described by the National Research Council in 1977 (Lathrop and Flattau, 1994) (listed earlier).

Li et al. (2022) also propose that there are many opportunities for departments and institutions to tip the balance for individuals considering an academic career and for enhancing their long-term commitment to such a career. Li et al. (2022) propose introducing the world of investigation and discovery in skin biology to individuals at the earliest stages of their training. In the United States, this may mean more summer research internships for high school and college students. We must introduce young people to the process of science, the camaraderie and collaboration of the laboratory environment, and the satisfaction of revealing the unknown. This may be best appreciated and retained by individuals before they experience the demands of medical school and residency. Early exposure to the joy of investigation and discovery can provide a strong imprint to help individuals endure the long and demanding early career of physician–scientists.

As Li et al. (2022) argue, developing a culture of discovery in our departments is critical. This culture must be encountered not only in the laboratory but also in the clinic. The primary goal of all mentors must be to teach the critical thinking and technical skills required to perform high-quality research.

Mentors also exemplify what a trainee can expect in a career as a physician–scientist. The challenges that face every investigator are significant, and they are bemoaned frequently (and often loudly). Mentors must make a conscious effort to also show trainees the rewards of the work. We must make certain that our trainees experience an environment where the joy derived from doing meaningful work and being part of something bigger than oneself is pervasive. Individual mentorship is clearly critical, but the mentorship of the crowd is just as important. Each young trainee must see the satisfaction of a career of investigation and discovery in all the members of their department: in clinicians and in basic, translational, and clinical researchers. Such an experience can be powerful and sustaining for a young investigator.

We must also introduce all our trainees to success. They must experience the joy and the feeling of success that arises from the process of investigation, process of discovery, and process of sharing that discovery with colleagues. The opportunity for young scientists to share their work promotes entrance into a community that will ultimately validate their efforts. Success can also be achieved by receiving financial support from departmental and local institutional grants and foundation awards. Repetitive, small successes can provide external validation and help to set the path for future success.

Finally, we must introduce young trainees to and integrate them into our community. It was interesting to see that many dermatology Societies (Society for Investigative Dermatology, Japanese Society for Investigative Dermatology, European Society for Dermatological Research, and others) are working hard to create communities amongst trainees and young investigators. One of the great benefits of a life in science is the collaborations and friendships that arise from the common

search for new knowledge. Promoting our young trainees' relationships with colleagues, both inside and outside of our own institutions, helps to build the network that will validate trainees' commitment and provide essential support throughout their careers. The development of specific programs that bring together trainees and senior mentors at meetings and symposia will help to build the community and provide the foundation for both personal and scientific growth.

We all almost certainly agree that the macro changes related to funding, length of training, and financial security must be addressed. We must continue to be strong advocates for growing support for research training by academic medical centers, private philanthropy, and government. However, history suggests that although this support is necessary, it alone will not be sufficient to solve the problem. We also all agree that excellent training in the methodology to perform high-quality, ethical research is essential, but the most important changes we can each make in our efforts to train and retain physician–scientists require no money, and we can start today. We can share the rewards and joy of investigation and discovery. We can introduce trainees to the community of investigators that not only advances our science but also provides a supportive network of colleagues. We can provide the environment for our trainees to experience these most fulfilling rewards in their own work. Although trainees will certainly face challenges and uncertainty in their careers, we must make sure that they realize the great satisfaction and true joy that are the rewards of a career focused on investigation, discovery, and communication of new knowledge.

*“The fascination of any search after truth lies not in the attainment, which at best is found to be very relative, but in the pursuit, where all the powers of the mind and character are brought into play and are absorbed by the task. One feels in contact with something that is infinite and one finds joy that is beyond expression in sounding the abyss of science and the secrets of the infinite mind.”*

*Florence Bascom, Geologist and Teacher, 1862–1945.*

#### CONFLICT OF INTEREST

The author states no conflict of interest.

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